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The Canadian Builder and Carpenter

Published Monthly by The Commercial Press, Limited, 32 Colborne St., Toronto

Who also publish: The Canadian Manufacturer, The Electrical Dealer and Contractor, Motoring Canadian Furniture World and The Undertaker, The Retail Grocer and Provisioner, Canadian Hardware Journal, The Retail Druggist of Canada,

Residence of M. G. Henniger, Contractor, Smiths Falls, Ontario.

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OF TORONTO

PLANS and description of this house, designed and erected by Mr. Henniger, a well-known builder and contractor, will be given in the July issue of The Canadian Builder. This house is modern in every respect.

See in this issue: Plans of Houses showing use of Stuccoboard.
Specifications for a Cottage.
Answers to Questions by Readers.
Three Departments of Practical Articles.

In an early issue plans of a Modern Garage will be given, and an illustrated article on built-in furniture.

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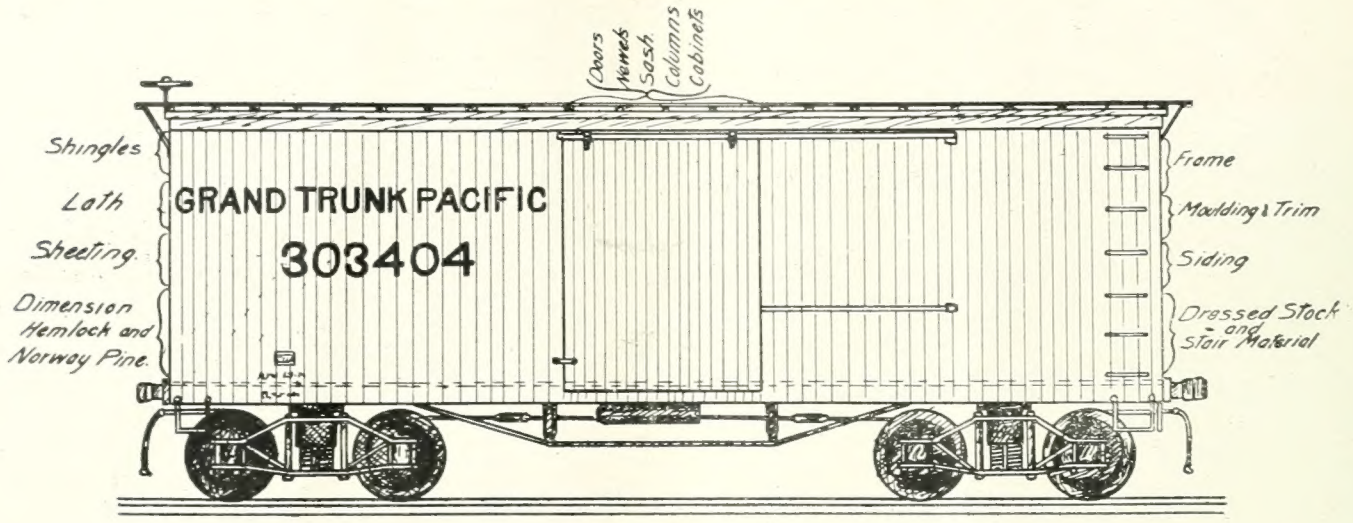
The Leading Stock Lines



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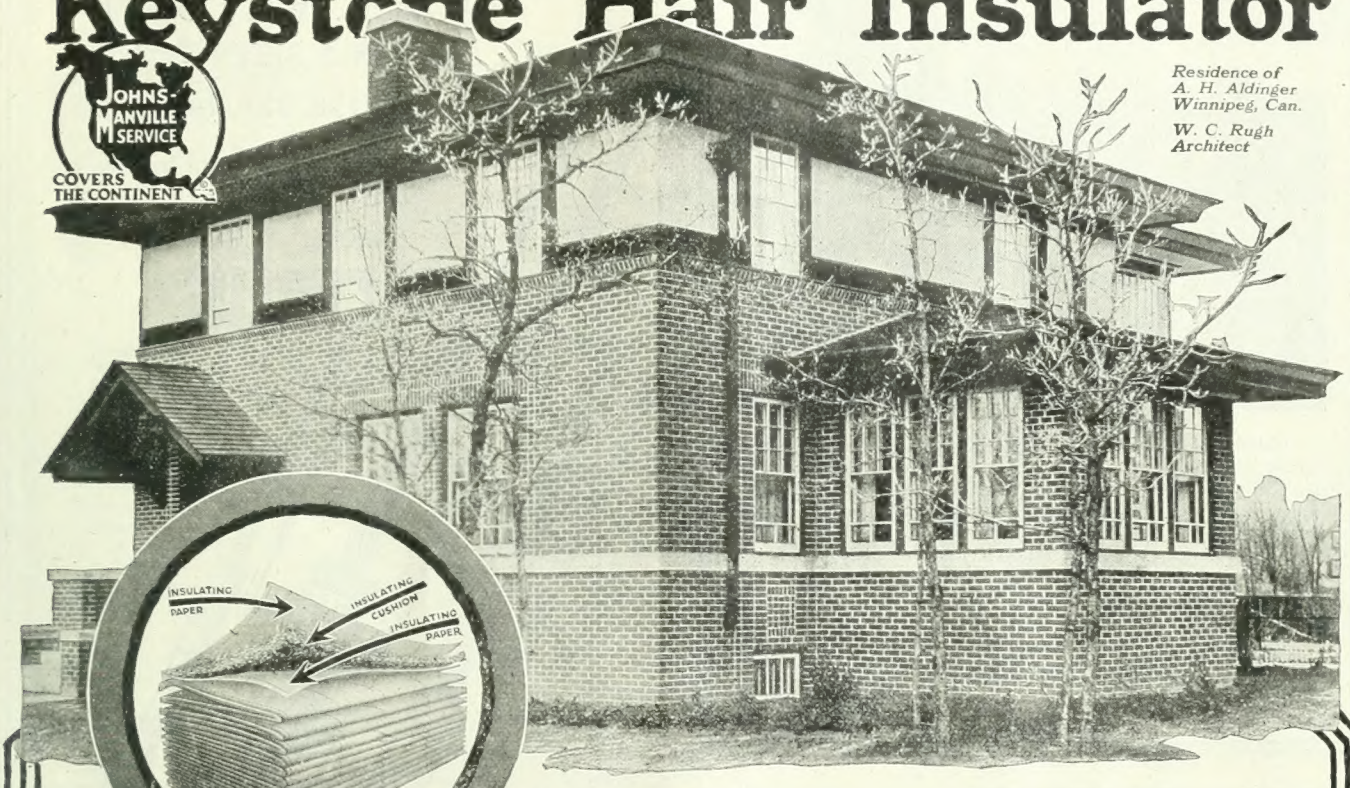

Residence of A. H. Aldinger Winnipeg, Can.
W. C. Rugh Architect

Unequalled as a sound deadener, and a barrier to heat and cold— Johns-Manville Keystone Hair Insulator

THE question of sound deadening should be carefully considered in the erection of every modern building. In many classes of structures it becomes imperative to check the transmission of sound from room to room and from the outside.

Homes or apartments that are properly insulated reap higher rentals and add to the value of the property. In business offices, educational institutions, hospitals, sanitariums, and conservatories, immunity from annoying sounds is almost a necessity

In every type of building, whether of wood, brick, or stone, Johns-Manville Keystone Hair Insulator is without equal as an insulation against sound. And not only does it assure sound absorption, but it makes a building warmer in winter and cooler in summer—an important consideration in regions of wide temperature range.

Write for Catalog No. 102 for further information.

The Canadian H. W. Johns-Manville Co., Ltd.

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Carload after Carload of Logs Required for Disston Hand-Saw Handles

Portion of Apple Logs in the Disston yards ready to be sawn into boards from which saw handles will be made.

Most first grade mechanics are thoroughly familiar with Disston *Quality*, but probably very few realize the scale of production the popularity of Disston saws necessitates. This photograph affords some idea of it. The picture is of a *portion* of the Disston lumber yard and only *one* kind of wood, apple (several others also are used)

These cars are coming in almost constantly. The lumber is sawn into boards in our own saw mill and stacked to season for three years before using.

That's the kind of demand the Disston reputation for quality has developed. ***Send for our Free Hand Book S.***

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A BIG CAPACITY, a small price. Built to last a lifetime. LIGHT AND EASILY MOVED from place to place. Can be operated with less men than any other mixer. Capacity 6 cubic feet per batch, 50 cubic yards per day.

WILL SAVE THE PRICE OF ITSELF IN 20 DAY'S USE.
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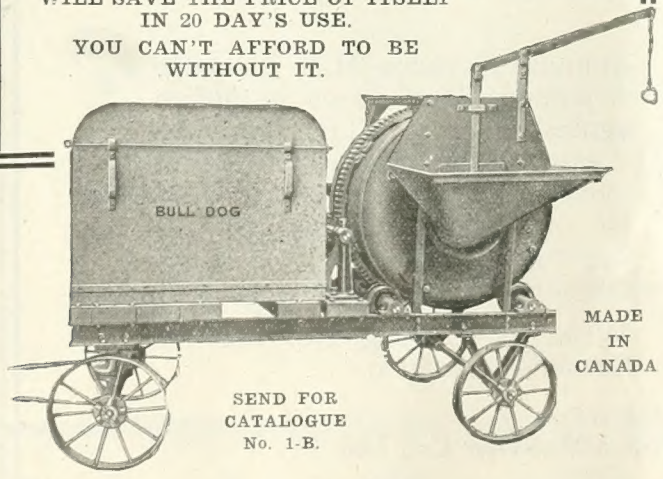

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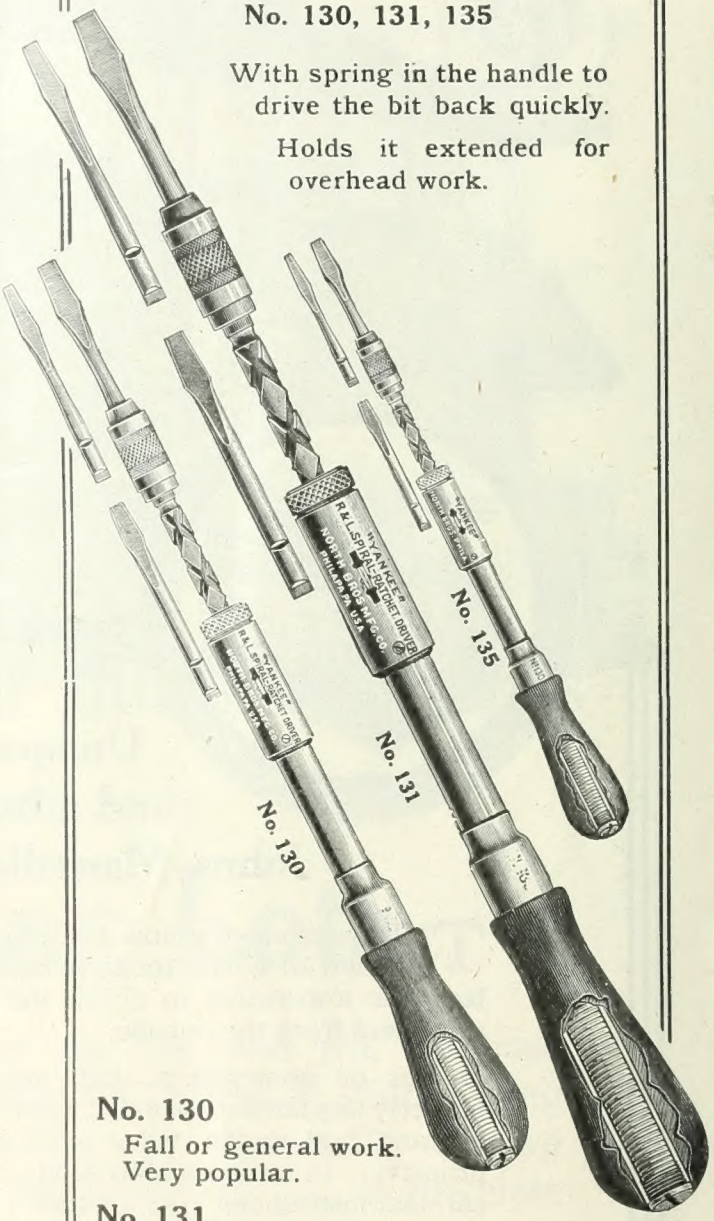
With spring in the handle to drive the bit back quickly.

Holds it extended for overhead work.



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Fall or general work. Very popular.

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Heavy pattern, for general house carpentry and heavy screw driving. Becoming very popular.

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Small size, for smaller screws, electrical work, and wherever a large number of small screws are frequently driven.

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NORTH BROS. MFG. CO.
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Residence at 295 Clemow Ave., Ottawa.

Bishopric Stucco Board used on all interior and exterior walls.

Residences of the better type, as well as those in whose construction cost is a first consideration, are being built to advantage with

BISHOPRIC STUCCO BOARD

As a background for Stucco for outside walls, and for plaster on inside walls, Bishopric Stucco Board is not only the CHEAPEST—it is the BEST.
All dampness is excluded by the thick layer of Asphalt-Mastic which forms its body, the Stucco or Plaster is permanently held by the dovetailed lath—while the sized fibre-board holds the material firmly together and acts as an additional heat insulator. The result is a house that is wonderfully warm, dry and comfortable—substantial looking and durable—surprisingly economical—and never in need of paint.
Write for sample of Bishopric Stucco Board and particulars of its use and cost.

Bishopric Wall Board Company, Limited
529H Bank St. - OTTAWA, Ont.

NEPONSET Paroid ROOFING

QUICKLY LAID AT ANY ANGLE

You do a better job in less time when you roof with PAROID. And don't forget that PAROID roofs laid 18 years ago are still giving satisfaction.

Look for the Neponset trade mark when you buy roofing materials.

LASTS LONGER BECAUSE MADE BETTER

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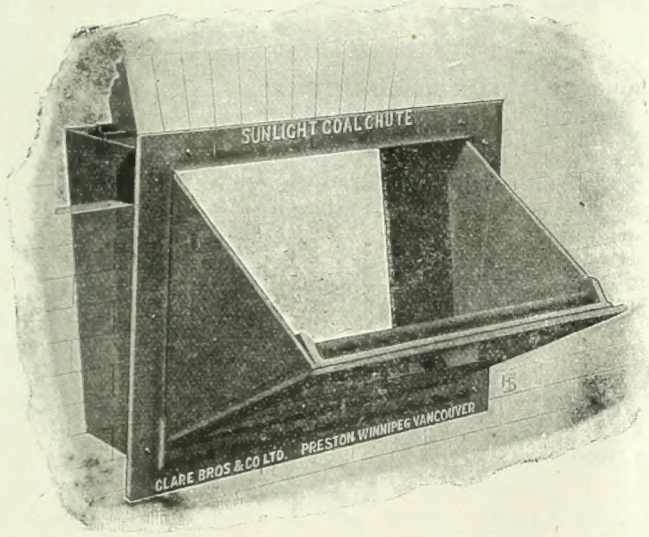
The Largest Manufacturers of Roofings, Wall Board, and Roofing Felts in Canada



The Window Chute

is no longer a luxury but a recognized necessity in every up-to-date building.

Open—It's a chute through which fuel can be put into the basement with ease and convenience.

Closed—It's a window that locks automatically and can be opened only from the inside.

A Basement Window used for taking in fuel must be continually repainted, repaired and reglazed.

A Window Chute needs no repairs and is always neat and clean.

Prices sent on request.

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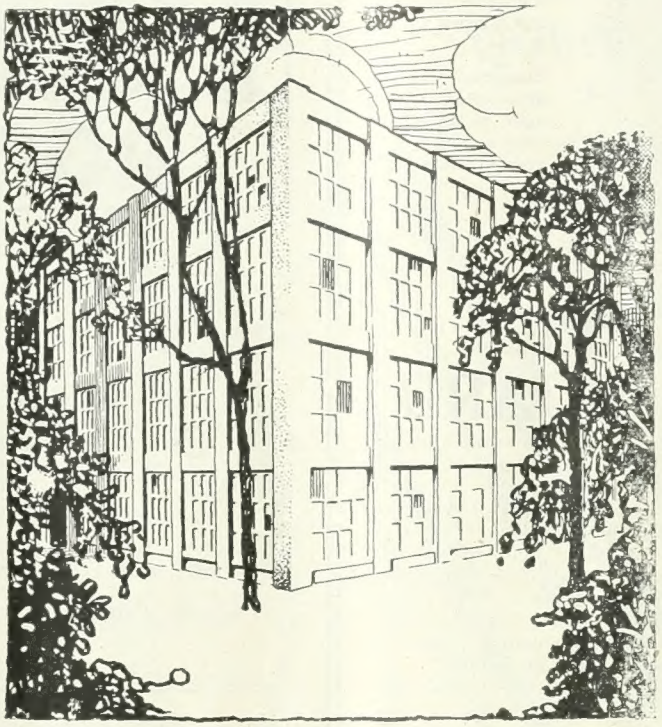

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AND BEAUTIFUL

THE special qualities of concrete construction that render it ideal for almost any type of building, recommend it especially for factory buildings and warehouses.

Reinforced concrete is fire-proof and permanent. Its first cost is low—its maintenance cost positively less than that of any other kind of building you can erect.

Send for our literature on buildings of this description. It will prove of interest to any architect or contractor.

Canada Cement Company
Limited

10 Herald Bldg. - Montreal

CONCRETE FOR PERMANENCE

CANADA CEMENT COMPANY LIMITED PORTLAND CANADA CEMENT MONTREAL

The Canadian Builder and Carpenter

D. O. McKINNON, General Manager — Published by The Commercial Press, Ltd., 32 Colborne St., Toronto, Ont. — G. C KEITH, M.Sc., Editor

VOLUME 7 — TORONTO, JUNE, 1917 — NUMBER 6

Editorial Contents

Things in Which Canada Leads

While Canada's population may be small in comparison with the leading countries of the world, we should be proud of the fact that in some things we outstrip all others. For instance, Canada has the largest individual elevator plant in the world, the Canadian Northern Railway's terminal elevator at Port Arthur, with its present total capacity of 10,000,000 bushels, having the right to claim for itself the largest consolidated elevator plant on the globe. It has a capacity of 30 cars, and it has been estimated that under conditions of urgency 600 cars of wheat a day could be unloaded. With cars averaging 1,000 bushels, that would mean 600,000 bushels, elevated, weighed and binned in one day of two shifts.

The honor of having the largest flour mill in the British Empire also falls to Canada. This mill being located at Port Colborne, Ont., and having a daily capacity of 10,000 barrels. It is owned by the Maple Leaf Milling Company. The length of the mill and elevator combined is 665 feet. The main flour mill building itself it 60 feet wide and 297 feet long, and is seven stories high. It is installed in two units, each of which contains 109 roller mills.

Canadians should feel proud of these features in which Canada leads other countries.

Good Business in New Verandahs

If you look about you will see dozens of houses where a new verandah would add immensely to the appearance and value of the property. There is a big market for the builder in new verandahs alone. Don't overlook this important chance as there is nothing that will so add to the appearance of a place as a well built verandah.

Builders Should Provide Ample Electric Outlets

Architects in all the big cities are specifying more baseboard outlets than ever before in connection with electric wiring of all buildings. This has become very necessary in order to provide adequate accommodations for the numerous ornamental and useful floor and table lamps and the thousand and one electric appliances of all descriptions which are so popular to-day. Closet lights, too, are always needed.

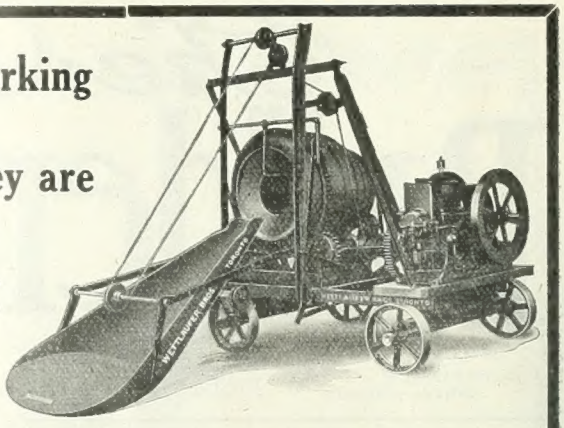
Anyone erecting a new building should give heed to the architect's wise advice to provide plenty of such outlets. Even if the immediate occupant is not positively going to need all of these outlets for his convenience right away, it will not be long before the value of them will be amply demonstrated. In any case their value comes into play rather prominently when one tries to sell to a prospective buyer who wants a building that is up-to-date in these matters.

Standard Sizes of Concrete Mixer

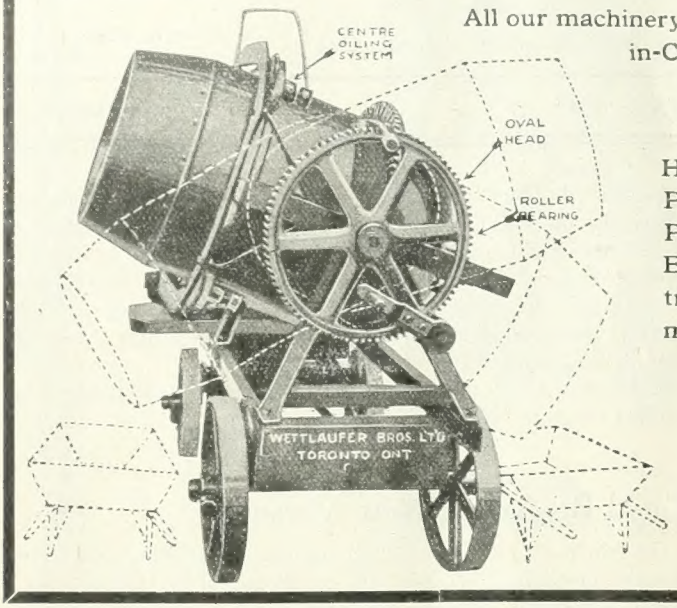
Standard sizes recently adopted by the National Association of Mixer Manufacturers provide for side loading concrete mixing machines with capacities of 4, 7, 14, 21, or 28 cubic feet each, and for end loading or paving mixing machines with capacities of 7, 10, 14, or 21 cubic feet each.

"John, that's a fine Mixer you have working there! Where did you get it?"
"Oh, that's a Wettlaufer Machine, and they are real Mixers, and don't you forget it!"

These remarks are heard every day. Our Heart-Shape Mixers are noted for speed and economy. We give our customers the best there is.

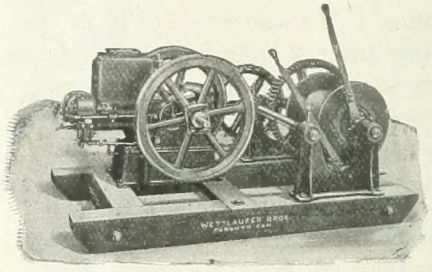


All our machinery is Made-in-Canada



CONCRETE MACHINERY

Hoists, Crushers, Rolls, Brick, Block, Tile and Sewer Pipe Machinery, Screens, Pumps, Dump Cars, Road Paving Mixers, Builders' and Contractors' full equipment, etc.



Write for Catalogue and Special Offers

Wettlaufer Bros. Ltd. 178K Spadina Ave.
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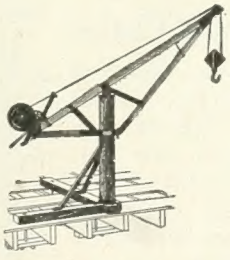
Save Labor and Money



We have a full line of labor saving derricks, for the Builder and Contractor, which may be used economically for handling flooring, timbers, etc. Materials can be quickly loaded or unloaded, or raised into positions on the floor of a small or large building.

The Sasgen circle swing derrick shown herewith has a capacity of 2,500 lbs., weighs 350 lbs., is 8 ft. high and has a 10 ft. swing. It has a boom and load break, and is built so that the boom can be quickly detached. The mast folds to the bottom sills, making easy to take apart or set up.

Use a Sasgen Derrick. Write for full particulars and prices. It will certainly interest you.

National Equipment Co. Limited
1 Wabash Ave., Toronto

Notice to Readers

Have you put up what you consider an attractive house recently?

You will have drawings or blue prints, bills of materials and specifications.

Why not send them to us for publication in The Canadian Builder. The advertising you would get as a result would make it well worth your while.

The Commercial Press, Limited
Toronto

Two new Ottawa houses. The first story of the pair on the left is faced with brick, otherwise the houses are stucco board and plaster board throughout.

HOUSES OF BRICK AND STUCCO FINISH

Two pairs of houses, one pair with brick exterior for first storey, lathboard and plaster interior; the other pair with stucco board and stucco exterior and lathboard and plaster interior.

W. Herbert George

Architect

TWO pairs of Ottawa houses of artistic appearance are shown in the accompanying halftone illustrations. The line cuts show the plans of the basement, ground and bedroom floors.

As will be seen one pair is built of brick for the first story. The upper story is built of Bishopric stucco board for the stucco finish. The inside is finished in Bishopric lath board and plastered. The pair to the right are entirely finished outside with stucco board and stucco finish with an interior finish the same as the other pair.

Each pair has a frontage of 32 ft. The main part of the house runs back 32 ft. 8 ins. The kitchen at the back with entrance to basement measures 13 ft. 8 ins. by 23 ft. 4 ins. The total depth of the houses is therefore 54 ft. 4 ins.

The basement is equipped with a coal chute which entirely prevents the destruction of a window for putting in coal. Coal chutes are made of iron and are strong enough to carry the wall above, no additional lintel being required. The old fashioned window loses the paint with the first load of coal and soon becomes disreputable in appearance. The iron chute, no matter how much it is used, protects the brick wall, cannot be damaged and retains its good appearance. They are therefore to be recommended for general use.

Ground Floor Layout

On the ground floor is a large verandah. In the living room is a fireplace with ash chute to basement.

The stairs are located centrally. At the rear of the stair hall is a commodious coat closet.

The hall idea is rather unique, being carried out through the house as will be seen by the arrangement of the dining room. In the dining room is a base plug for the use of electrical household conveniences.

The kitchen is fully equipped with shelves. The entrance to the basement is direct from the kitchen.

The Bedroom Floor

On the bedroom floor are three large bedrooms. The two front ones have generous closets and there is a linen closet accessible from the hall. Over the verandah is a large balcony with entrance from the front bedroom.

Lath Board Construction

The products used for stucco work and plastering make these houses of considerable interest to the

builder. The Bishopric lath board which was used, consists of a sheet of sulphite fibre board coated with an indestructible asphalt composition, toughened by a patented process, which sheets are reinforced by embedding in the molten asphalt, the best quality of four foot pine lath, making a board which is light, easily transported and applied, yet strong and tough—water and vermin-proof and not affected by atmospheric or climatic changes of any kind. The lath reinforced fibre board, coated with asphalt, makes an air tight wall.

Being made in four foot squares it is convenient to handle and fit, so that a builder or lather can easily apply direct to the studding or beams of any building, with less effort and waste than common lumber.

The peculiar manner of construction insures a rigid non-breakable wall, dry and tight, making a back ground for any finish desired. Using an ordinary saw, it cuts easily and is quickly fitted to any space or shape. It does not warp, crack, twist or pull away from supports, and will remain intact so long as the building stands. No repairs ever become necessary due to falling plaster.

How to Apply Lath Board

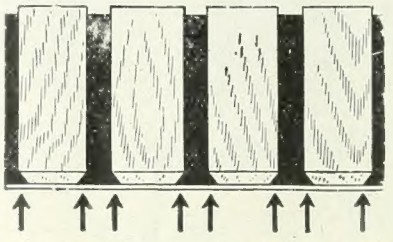
For interior walls simply nail lath board to the studding, which should be placed at 16 inch centres, using ordinary 1½ in. wire or lath nails, one nail in each lath at each stud, covering the board with paper, paint or burlap, as most desired.

A "header" or strip of wood should be nailed horizontally between the upright studding, and the edges of each sheet nailed to these "headers." This prevents any movement at the joints and also insures a stiff wall.

The fibre board of which lath board is made is ready sized and will therefore take paint or kalsomine.

Beautiful panel effects are easily obtained by using strips of lath board about four inches wide, which are applied right over the lath board after it is papered. These strips can also be papered in contrast to wall itself, and edges finished with a small bolection moulding, as shown here. This makes a most durable wall, no danger of plaster giving way and crumbling behind the paper. Several plans of panelling have been printed and will be mailed free to interested parties upon request.

There is no limit to the pleasing effects that can be realized through the panel work of lath board. Color harmony can be tastily expressed in tints of paint, fresco, alabastine, kalsomine or wall paper. A different ideal piece of panelling in each room. Something individual. Something that will harmonize in color and design with your furniture, draperies and woodwork.

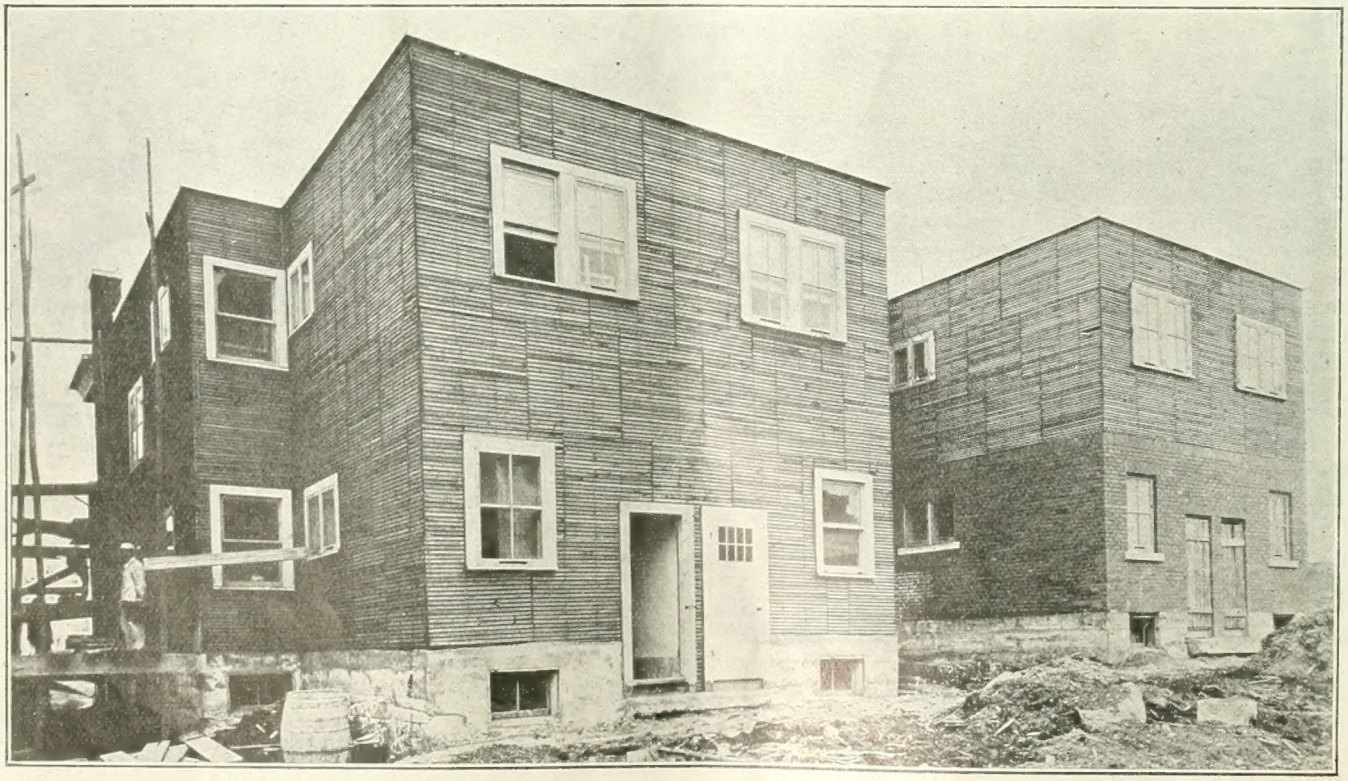


Showing dovetail joints which hold the plaster.

Ceilings can be made to have a rich appearance by adapting beam work which is easily accomplished with lath board.

Stucco Board for Stucco Finish

Bishopric stucco board consists of an asphalt coated sulphite fibre board, with bevelled or undercut lath, embedded in the molten asphalt under great pressure, in such a manner that the spaces between the lath form



Rear of two houses described herewith, showing the stucco board before the application of stucco, concrete foundation and brick first story.

"dove-tailed recesses, into which plaster or stucco is forced, forming keys which hold the plaster. This is shown in one of the illustrations. The asphalt, with which the fibre board is coated is moisture and vermin proof and resists fire. Stucco board makes a good background for stucco, cement and plaster.

Stucco board is nailed direct to the studding, and plaster or stucco is applied directly onto it.

The space between the studding being a dead air space, protects your house from the cold of winter and the heat of summer.

Stucco Mixture

The following mixture has given good results on stucco board:

First coat—2 parts sand; 1 part cement; 5 per cent. lime. Put all the hair in lime that it will carry.

Second coat—same as first.

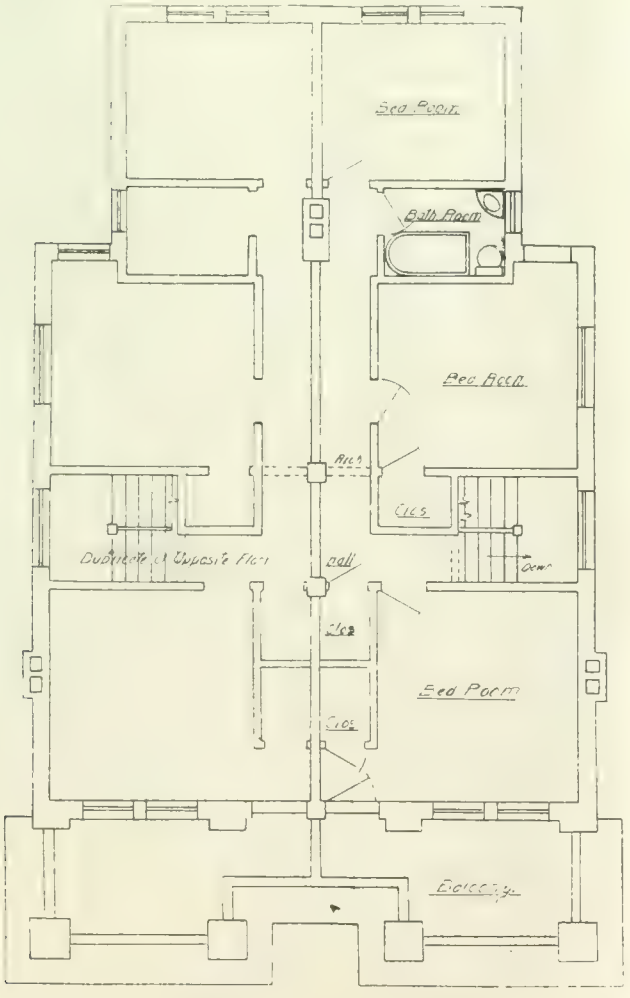
Third or dash coat—3 parts gravel; 1 part sand; 1 part cement; 1 pail white wash, made to ordinary thickness. See that sand is clean and sharp.

Stucco board should be sprayed before applying stucco.

Stucco or plaster board is also good for use under floors, preventing dampness from penetrating into the house from the basement.

* * *

Interesting history of ancient saws is presented now and then, but no man has so far undertaken to tell us what kind of saws were used by Noah in building the ark, or how they were used.



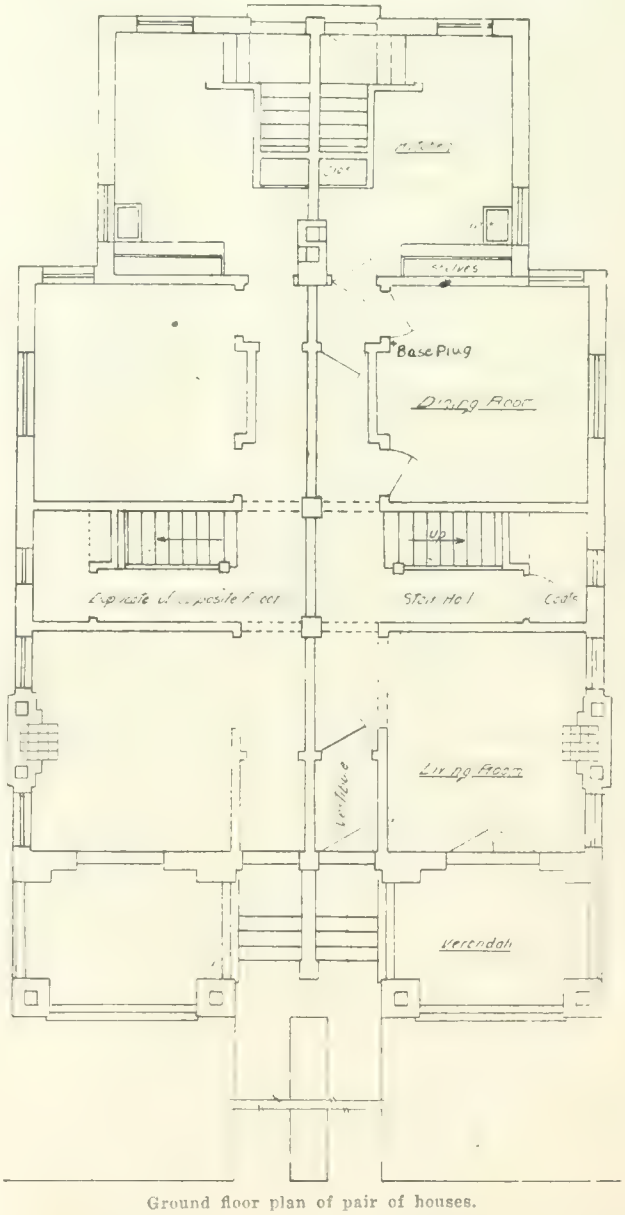
Bedroom floor of pair of houses.

Looking After Repairs and Small Jobs

Although taking the country as a whole the building trade in Canada is in a much healthier condition than it was a couple of years ago, yet it still falls short of the activity which characterized it in pre-war days.

Detail photo of fronts during construction. The brick pillars on left are solid. The stucco columns on right are stucco board over four 2 x 4 scantling.

Many people who would like to build now are precluded from doing so on account of the high cost of labor and materials. As to whether conditions obtaining after the war encourage them to build then,



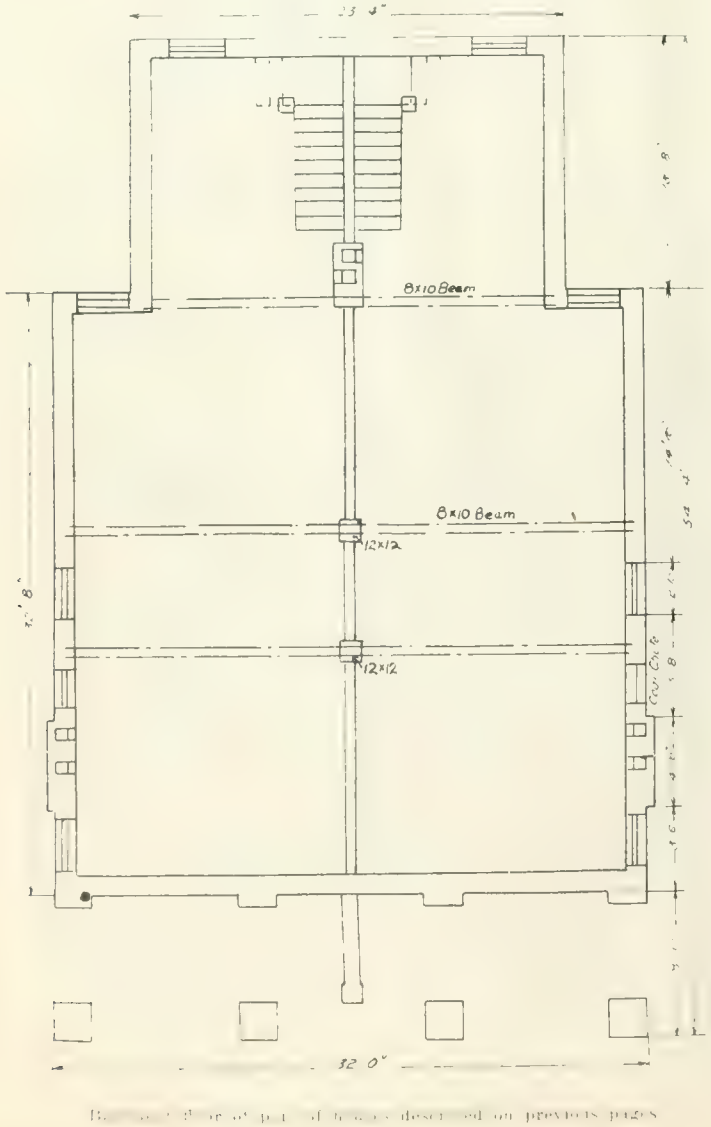
Ground floor plan of pair of houses.

remains to be seen. Probably labor may cost less, but that material will be much if any lower is less promising. The enormous demand for material that is probable then is likely to preclude it. And then there is the return of the soldiers, to say nothing of the probable increase in immigration, to be taken into consideration. That will undoubtedly tend to stimulate the erection of small and medium-sized dwellings.

But in the meantime why should not builders, and particularly those of the small and medium kind, try to induce owners of stores and buildings of various kinds, to make necessary improvements and additions? If they did that which commercial travellers are in the habit of doing, namely, look for business, the writer feels confident that quite a little work in this way could be picked up. Then, besides doing a little personal canvassing, recourse may be had to circulars and local newspaper advertising. In these circulars and advertisements it would be necessary, of course, to try and cultivate a desire in the minds of owners for having these improvements, alterations, or additions made. It should also be pointed out why the present is a favorable time for having them done.

Shortly after the outbreak of the war there was a small builder in Toronto who found himself in rather straightened circumstances because of the sudden decline in building operations. Being a resourceful fellow he immediately began to cultivate orders for the erection of low and medium priced garages. After securing two or three he had photographs taken of them. From these in turn he had engravings made and had them printed in a neat and well-worded little folder. This folder he then distributed among owners of automobiles, a list of which he obtained from the local authorities and motor car manufacturers. In time he had a plentiful supply of work on hand.

This is possibly a line of work, besides alterations and improvements in buildings, which other builders might develop.—William Lewis Edmonds.



Connaught Tunnel a Great Achievement

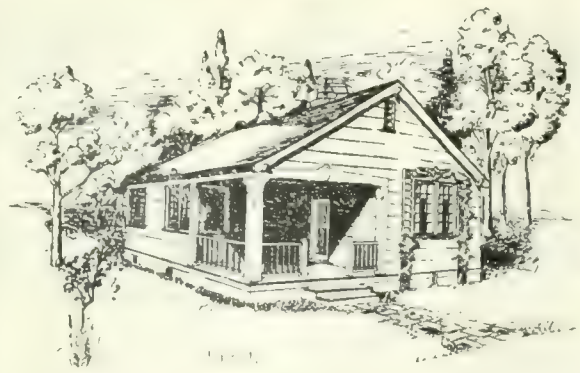
One of the greatest of the achievements of the Canadian Pacific Railway is the Connaught Tunnel. This great work through the lofty Mount MacDonald—amongst the Selkirk Mountains, is nearly six miles long and double tracked. The excavation has been made at a cost of over $12,000,000 to the great transportation company. But the C. P. R., which has spent from $25,000,000 to $35,000,000 per annum on the development of the West previous to the war, does not even in times of conflagration affecting the greater part of the world, spare expense where the public convenience makes an urgent demand. The opening of the tunnel will greatly facilitate traffic, will open a new route, will do away with many miles of snow sheds.

Interesting Factory Repair

To rebuild a structure which is in danger of collapse and, at the same time, not to interrupt the work of the factory, was a task recently undertaken by a Montreal firm of contractors, when several other firms, including an expert from the States, declared that any attempt towards reconstruction would result in collapse. The factory is that of the Canada Box Board Company, Montreal and the work was undertaken by A. F. Byers & Co., Limited, under particularly difficult, if not dangerous, circumstances.

The whole building is situated over a tail-race, near the canal. One of the walls had bulged out, and was only saved from collapsing entirely by the adjacent wall of Ogilvie's Flour Mills. The foundations were also found to be giving way, and in order to substitute steel for iron pillars and concrete for wooden floors, it was necessary to raise the whole building about three-quarters of an inch from its supports. As the weight of the building and machinery approximated 1,000 pounds to the sq. in., this meant lifting a total of 3,600 tons. This was successfully accomplished without accident, and the structure was put upon temporary supports (which operation is known as shoring), requiring the use of 350,000 feet of timber. The foundations had also to be reconstructed, and, as the water was only out of the canal a week, men were working day and night on this job, which was completed recently. In the meantime the factory operations have been going on without interruption, and will continue while the contractors are constructing what will virtually be a new building.

The man who takes pains to cheer up at meal times is likely to have less trouble in cheering up at other times.



CONVENIENT $625 BUNGALOW

With specifications and summary of costs.

Fig. 1.—Elevation of bungalow described in this article.

A FIVE-HUNDRED-DOLLAR bungalow that will serve as a home in most climates is practicable, as is shown herewith.

The plumbing is of the simplest kind possible, consisting of a rain barrel, placed under cover where it will not catch dirt or freeze in winter; two short lengths of pipe connected with the barrel and running to the kitchen and washroom; a faucet and a sink in each of these rooms, and a drainpipe connecting with a terra-cotta drain to carry waste water away from the house. The sinks used are a 12-by-16 inch one for the kitchen, listed at $1.10, and a 12-by-12 inch one for the washroom, listed complete with stopper and chain at $2.

The rain water taken from the roof and carried through galvanized-iron conductors to the barrel. If more elaborate bathing facilities are required a larger tank could be placed in the attic and the water pumped into it by a hand pump, hydraulic ram or other device. The better system, as has been described in The Canadian Builder, is recommended.

Foundations

The foundations of the house consist of wood posts. They should be given a coat of creosote before being put into place, to protect them from rot. The sill, which rests directly on top of the foundation posts, is made of two 2-by-8-inch timbers spiked together. The frame of the house is built of 2-by-4-inch studding, 2-by-8-inch joists, 2-by-6-inch ceiling rafters and 2-by-8-inch roof rafters. The outside walls are covered with heavy waterproof building paper tacked to the studding under the siding boards. The siding is 12-by-1-inch rough boards, laid so each board will overlap the one below it two inches.

Roof, Floor and Windows

The roof is of shingles laid on shingle lath. Number two yellow-pine flooring is used throughout. For cold weather I should advise putting in a double floor, the under one to be of rough boards. Building paper or old newspaper should be placed between the floors.

The windows are all casements and the frames and sash, ready glazed, can be bought ready made in stock sizes and design. The doors may be batten doors made on the job by the carpenter, or can be bought in stock sizes for a little more.

Plaster Finish

The plaster is two-coat work, the second coat being mixed without hair and given a sand finish. The fireplace is of field stone, gathered near by, and is of simple design, with a hearth of flat stones and a two-inch plank metal shelf.

The trim for the windows and doors is plain 4-by-⅞ inch strips; the base board is a 6-by-⅞ inch board beveled at the top.

The exterior woodwork is given two coats of paint. The interior woodwork receives one coat of stain and flat varnish, mixed in equal parts.

The allowance for hardware will provide a good lock for the front door, and plain black thumb latches and bolts for the other doors. The outside door and window hinges are galvanized and all other hinges are black. The windows are provided with bolts.

Summary of Costs

Lumber	$201.00
Millwork	100.00
Plaster	31.00
Fireplace, labor and mortar (stone not included)	63.00
Hardware, including nails, etc.	25.00
Painting	31.00
Plumbing (labor and material)	31.00
Carpenter work (one carpenter and one helper)	143.00
Total	$625.00

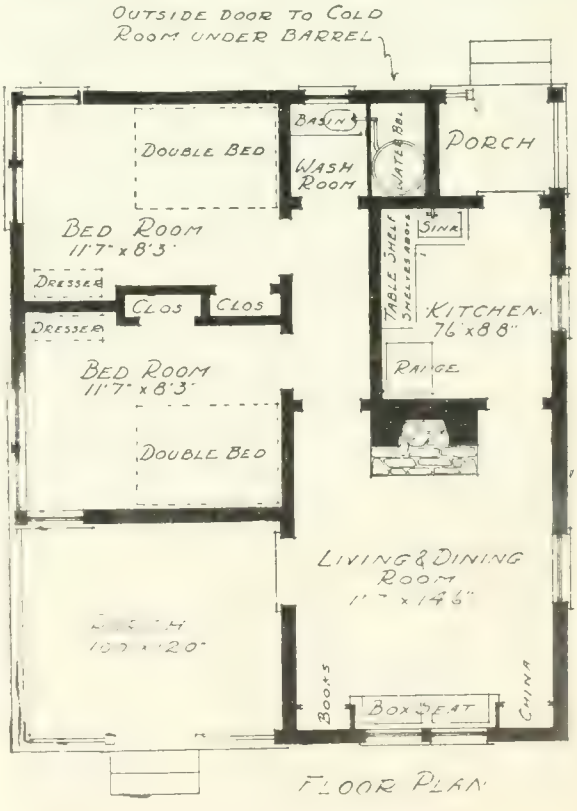
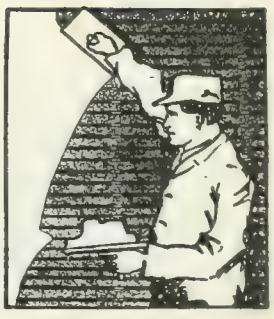


Fig. 2.—Floor plan of bungalow described in this article.

Brick Work and Plastering



Standard Rules for Measuring Plaster*

THE following are the standard rules covering the measurement of plastering as adopted by the Employing Plasterers' Association of the city of Chicago, and may be of interest to the trade in other parts of the country.

Lath and plastering to be measured by the superficial yard, from floor to ceiling for walls, and from wall to wall for ceiling.

In rooms containing one or more horizontal angles between the floor and ceiling line, the ceiling to be measured from wall to wall, as though all walls were vertical; for contents of ceiling, and from floor to highest point of ceiling for height of wall.

Openings

Openings in plastering to be measured between grounds. No deductions to be made for openings of 2 ft. or less in width. One-half of contents to be deducted for openings 2 ft. or more in width. The contents on all store front openings to be deducted, and the contractor to be allowed 1 ft. 6 in. for each jamb by the height.

All beams or girders projecting below ceiling line to have 1 ft. in width by total length added for each internal and external angle.

No openings to be deducted from "solid" or "hollow" metal lath and plaster partitions nor for openings in suspended ceilings containing less than 100 sq. ft., where furring is carried around such openings by plasterer. No openings to be deducted from cement wainscot or base.

Corner Beads, Arches, Etc.

All corner angles of more or less than 90 deg., beads, "bullnoses," quirks, rule joints and moldings, to be measured by the lineal foot on their longest extension, and 1 ft. for each stop or mitre.

Cornices

Length of cornices to be measured on walls. Plain cornices of 1 ft. girth or less to be measured on walls by the lineal foot. Plain cornices exceeding 1 ft. girth to be measured by the superficial foot. Add one lineal foot to girth for each stop or mitre. Enriched cornices (cast work) by the lineal foot for each enrichment.

Arches, corbels, brackets, rings, centre pieces, pilasters, columns, capitals, bases, rosettes, bosses, pendants and niches, by the piece. Seiling or frieze plates over 8 in. wide by the square foot.

Columns

All columns to be measured by the lineal foot for plain plastered columns.

Cement Wainscoting and Base

All cement wainscot to be measured by the square foot, and cement base by the lineal foot.

*Chapter taken from the handbook issued under the auspices of the [illegible] Society of Architects.

Grounds

All grounds for various classes of work to be as follows, unless expressly specified to the contrary.

Grounds for 2-coat lath work	$\frac{7}{8}$ in.
Grounds for 3-coat lath work	1 in.
Grounds for 3-coat metal lath work	$\frac{5}{8}$ in.
Grounds for 3-coat metal lath work, on ½ in. iron furring	$1\frac{1}{8}$ in.
Grounds for 3-coat metal lath work, on 1 in. iron furring	$1\frac{5}{8}$ in.
Grounds for hard mortar metal lath work	$\frac{5}{8}$ in.
Grounds for hard mortar metal lath work, on ½ in. iron furring	$1\frac{1}{8}$ in.
Grounds for 2-coat work on brick or tile	$\frac{5}{8}$ in.
Grounds for hard mortar on brick or tile	$\frac{5}{8}$ in.
Grounds for hard mortar lath work	$\frac{7}{8}$ in.
Grounds for plaster board	$\frac{7}{8}$ in.

Where metal lath is spoken of it applies to all wire or metal lath.

Jurisdiction Claims

By Plasterers' Union, any and all plastering, regardless of the nature of the material or of the structure to which it is applied. By Lathers' Union, any and all lathing, metal corner beads, all light iron furring designed, specified or used primarily as a support for lath and plaster.

Patching of plastering after other mechanics shall not be done as a part of the contract price and shall be paid for at the following scale of prices, which are in accordance with present wage agreements:

Plasterers	90c per hr.
Lathers	90c per hr.
Laborers	60c per hr.
Mortar	$1.50 per bbl.
Putty	$2.00 per bbl.
Stucco	70c per cwt. jute sack
Cement	70c per cwt. jute sack
18-gauge ¾ in. mesh painted wire lath or 24-gauge metal lath painted	25c per yd.
1½ in. jute lath	35c per bunch

The Economical Brick Mortar

The use of lime in cement mortars is not new; its advantages have stood the test of time; and for years the use of lime with cement was standard practice. Investigation of the construction work of years ago indicates that it was universal practice to specify in all good work a thoroughly aged lime putty mortar gauged with natural cement. Later Portland cement was substituted for the natural cement.

Lime mortars are amply strong for the greater part of brick work. They are much easier to apply and the cost of labor and material is much less.

The old method was to gauge mortar made from lime putty and sand with cement. This was rather an unsatisfactory system because of the difficulty in securing accurate proportions of the cement to the lime and sand used, and in many cases it was claimed that the contractor only "shook a bag of cement at the mortar

box now and then." This uncertainty, together with annoyance of preparing the lime on the job is largely responsible for so many specifications being written by architects and engineers for straight cement mortars. With hydrated lime, however, both these objections disappear. It is thoroughly slaked and prepared in a scientific manner before delivery to the work. It comes in sacks containing definite quantities, and there is no difficulty in getting accurate ratios of lime to the cement in the mixing of mortars, and it is easy for the inspector to see that the specific proportions are being used. The use of hydrated lime in cement mortars is merely reverting to a time-tried practice, which has been employed for years, and which, as shown by the work, was entirely satisfactory.

For years it has been known that the addition of a small amount of hydrated lime to cement mortar in brick work results in a more plastic, freer spreading material under the trowel. It has been the custom in many cities to specify a proportion of hydrated lime in cement mortar because it was recognized that it would make work easier.

The mortar being worked more easily under the trowel, permits mechanics to more firmly embed the bricks, and with less physical effort. The bricks will slide freely and the mortar will be forced into crevices where it is impossible to put the trowel. This all results in a bearing surface for each brick which cannot be gained by a hard working mortar.

The practical effect, however, of such mixtures of cement and hydrated lime has always been a debated question and it has remained for Prof. James S. Macgregor, of Columbia University, to arrive at actual facts, and in establishing these facts the question of debate has been removed.

Object of Investigation

Professor Macgregor's investigation was conceived for the following reasons:

1. To indicate what value, from the standpoint of strength, the better bearing surface given to the bricks would possess when laid up with cement-lime mortars of varying proportions.

2. To determine the practical effect on strength when bricks absorb a portion of the moisture from the mortar and thus rob the mortar of the moisture needed to hydrate and harden the cement. This was to indicate whether the water carrying capacity of hydrated lime had a value in retaining moisture in the mortar which would be passed off to the cement and taken up in subsequent hydration, thus resulting in increased strength. The results shown in the "Summary of Ultimate Resistance" proves this reasoning established beyond doubt.

Outline of Investigation

The investigation as outlined consisted in laying up seven different sets of brick piers 8 in. x 8 in. x 84 in. high, each set consisting of 9 piers and being laid up in mortar of different proportions, with varying amounts of hydrated lime. Three piers of each set were tested under compression to the point of rupture at three different periods, namely, 7, 28, and 90 days, the results shown being the average of three piers at each period.

The bricks used in the 63 piers were hard-burned face bricks purchased in the open market in New York City. There were also laid up seven piers 8 in. x 8 in. x 84 in. of common bricks, each with a different mortar mix, to be tested under compression at the 28-day period, the results of which were to serve as a check on the results shown by the face brick piers. Comparison of ultimate resistance of common brick with face brick, page 29, shows how the general conclusions to be drawn agree and that the same underlying economic and structural value of hydrated lime applies to face and common brick alike.

Description of Mortars

The purpose of the investigation being to determine the effectiveness of hydrated lime, and also to determine to what extent Portland cement might be replaced by hydrated lime without reducing the factor of safety under practical conditions, mortars were mixed containing varying proportions of hydrate. The seven (7) mortars which were used in the investigation were mixed in the following proportions:

Mixtures Used—By Volume

No. 1.	1.00 cu. ft. Portland Cement.
	3.00 cu. ft. Sand.
No. 2.	0.90 cu. ft. Portland Cement.
	0.10 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.
No. 3.	0.85 cu. ft. Portland Cement.
	0.15 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.
No. 4.	0.75 cu. ft. Portland Cement.
	0.25 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.
No. 5.	0.50 cu. ft. Portland Cement.
	0.50 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.
No. 6.	0.25 cu. ft. Portland Cement.
	0.75 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.
No. 7.	1.00 cu. ft. Hydrated Lime.
	3.00 cu. ft. Sand.

The proportions given are all by volume, and this method of measuring was followed because it is the general custom in writing building codes to so specify quantities.

Hydrated lime is nearly two and one-half (2½) times as bulky as Portland cement (hydrate weighing approximately 40 pounds per cubic foot, and Portland cement weighing approximately 94 pounds) and the true economic advantage of such volumetric replacements of Portland cement by hydrated lime cannot be fully realized until the quantities shown have been reduced to corresponding weights, the basis upon which Portland cement and hydrated lime are purchased.

On the basis of weight, the mortars previously shown are approximately equivalent to the following:

Mixtures Used—By Weight

No. 1.	300 lbs. Portland Cement.
	300 lbs. Sand.
No. 2.	90 lbs. Portland Cement.
	4 lbs. Hydrated Lime.
	300 lbs. Sand.
No. 3.	85 lbs. Portland Cement.
	6 lbs. Hydrated Lime.
	300 lbs. Sand.
No. 4.	75 lbs. Portland Cement.
	10 lbs. Hydrated Lime.
	300 lbs. Sand.
No. 5.	[illegible] land Cement.
	20 lbs. Hydrated Lime.
	300 lbs. Sand.
No. 6.	25 lbs. Portland Cement.
	30 lbs. Hydrated Lime.
	300 lbs. Sand.
No. 7.	40 lbs. Hydrated Lime.
	300 lbs. Sand.

It will be noticed that the mortar designed as No. 5 contained a total of 70 lbs. of cementing agent with

300 lbs. of sand, or 1 to 4.3 by weight, which may be compared with mortar No. 1 which was composed of 100 lbs. of cementing agent to 300 lbs. of sand, or 1 to 3 by weight.

The economic advantage, the saving in dollars and cents, between mortar No. 1 and mortar No. 5 is therefore measured by the decreased quantity of cementing agent contained in a given volume of mortar, or approximately 30 per cent. saving, provided hydrated lime and Portland cement are sold at the same market price per unit of measure.

Summary of Ultimate Resistances

(Face Brick Piers)

Figures shown are in pounds per square inch.

Each result is an average of crushing three piers.

Mortar Mix No.:	1	2	3	4	5	6	7
Crush at:							
7 days	2630	3080	2890	3120	2760	1945	1535
28 days	2840	3170	3230	3470	3140	2370	1870
3 months	2840	4435	4300	4170	3820	2720	1950

It will be noticed that the results, when Mortar No. 5 was used, show a compressive value of 980 lbs. per square inch greater than Mortar No. 1 in 3 months. It has already been noted that Mortar No. 5 contains 30 per cent. less of cementing ingredients (or 43% more sand carrying capacity). Herein lies the extraordinary economic advantage, the greater strength at less expense.

Assuming the market price of Portland cement and hydrated lime to be the same, pound for pound, it will readily be seen that specifications calling for mortar to be composed of 50 lbs. of Portland cement, 20 lbs. of hydrated lime, and 300 lbs. of sand (approximately ½ cu. ft. Portland cement, ½ cu. ft. hydrated lime and 3 cu. ft. of sand) will not only give a much higher structural value, but will also make a saving of 30 cents on every dollar spent for the cementing mixture in brick mortars.

To insure accurate measurements in practical work, it may be stated that an eight-quart pail holds approximately 10 lbs. of hydrated lime, and for each bag of Portland cement used in making mortar four (4) pailsful of hydrated lime should be placed in the mixture to secure results equivalent to those produced in the No. 5 test.

The results of this investigation unquestionably determine that hydrated lime has a greater value in brick masonry than it is generally given credit for having.

The great economic advantage to be gained by adopting mortar No. 5 is best shown in the following table, which is based upon the price charged for mortar ingredients in Pittsburgh, Pa., for deliveries in less than carlots. Pittsburgh prices, at the time of writing this article, are: Portland cement, $1.80 per bbl. in paper; hydrated lime, $10.50 per ton in paper; sand, 80 cents per ton.

Mortar Mix—	1	2	3	4	5	6	7
	100 lb. C	90 lb. C 4 lb. hl	85 lb. C 6 lb. hl	75 lb. C 10 lb. hl	50 lb. C 20 lb. hl	25 lb. C 30 lb. hl	40 lb. hl
	300 lb. S	360 lb. S	390 lb. S	300 lb. S	300 lb. S	300 lb. S	300 lb. S
Crushed at							
7 days	2630	3080	2890	3120	2760	1945	1535
28 days	2841	3170	3230	3470	3100	2370	1870
3 months	2841	4435	4300	4170	3820	2720	1950
Cost of mortar to lay 1,000 bricks	2.18	2.08	2.03	1.99	1.71	1.48	1.24

Figures taken from the last report of the United States Geological Survey show that during the past three years an average of 8,747,333,000 bricks (face and common) have been sold each year. Assuming that one-half of this output each year had been laid with straight 1-3 cement mortar, then the economic loss, based on the mortar shown in column No. 5, would be $2,055,623 annually, besides having a lower structural value.—Cement and Engineering News.

Satisfactory Tests of Tile Walls

During the month of April, the first of several tests of tile walls were made by the United States Bureau of Standards. While previously various commercial tests of the load-carrying capacity of tile walls had been made, in the present case the work is part of a large investigation which is being made at the suggestion of the tile manufacturers of the committee on hollow tile of the American Society for Testing Materials.

About 50 walls of various heights and thicknesses will be made. Those tested during the month were 12 feet high, 4 feet long, and either 12 or 6 inches thick. The tests of the walls were very satisfactory in every case, very high loads being obtained and the material showing excellent deportment.

Building Situation in Montreal

Permits to erect new buildings and to make alterations were issued during the past month calling for a total expenditure of nearly half a million dollars; the cost of the new buildings for which permits were issued will be $351,289, and the cost of the repairs and alterations will be less than half that amount, $138,765, showing that the spring and summer new building has commenced in earnest.

That an effort is being made to catch up with the demand for moderate priced dwellings and that landlords are recognizing the opportunities to rent new houses, so as to yield a very fair profit, is shown in the granting of permits to erect ninety-seven dwellings. The other permits to put up new buildings were for thirteen garages, two stores, four warehouses, two factories, two office buildings, five stables and forty-eight sheds. Permits were taken out to make alterations to one hundred and thirty-six dwellings, thirty stores, one theatre, two warehouses, eight factories, two churches, one hotel, one office building, seven stables, nine sheds, and three garages.

Considering the backwardness of the weather and the high price of material, the value of buildings contracted for in May compares very favorably with the same month during the past two years. Talk of considerable building of dwellings is in the air, for it has come to be recognized that the price of materials is not going to come down until after the war—and many authorities say that the reduction even then in most lines except iron and steel will be very slight.

Weight of Bricks and Concrete

Soft brick weighs 100 lb. per cu. ft.; common brick, 112 lb. per cu. ft.; hard brick, 125 lb.; pressed brick, 135 lb.; fire brick, 140 to 150 lb., and sand-lime brick, 100 lb. Concrete weighs from 120 to 155 lb. per cu. ft.

Carpentry and Woodworking

A Safe Way to Remove Splinters

A simple and safe surgical appliance which is worth trying, if occasion calls for something along that line, is described in a recent issue of Wood-Worker. The writer says that one of the most annoying minor accidents to which every woodworker is subjected at times is to have a sliver of wood stuck in his hand, and its removal is painful if not properly performed. If the splinter is soft wood, it cannot be removed very easily with a needle or other sharp instrument.

A very easy and effective way of removing a splinter without pain or inconvenience is to take a wide-mouthed bottle—such as a milk bottle—filled nearly full of water as hot as the glass will stand. Place the injured part over the mouth of the bottle, pressing down slightly, thus preventing any steam from escaping. This will cause the flesh to be drawn down, and in a minute or so the steam will extract the splinter, at the same time preventing the inflammation which usually follows an injury of this kind.

Watertight Frames and Sash

In the recent past there has been more or less discussion of window sash so constructed as to prevent the entrance of water during a driving storm. Various have been the expedients for rendering the sash watertight, and in this connection it will probably prove interesting to many readers to present some comments by a correspondent of the Wood-Worker regarding water-tight frames and sash. The accompanying illustrations show the construction suggested both for sash to swing out and to swing in. He says:

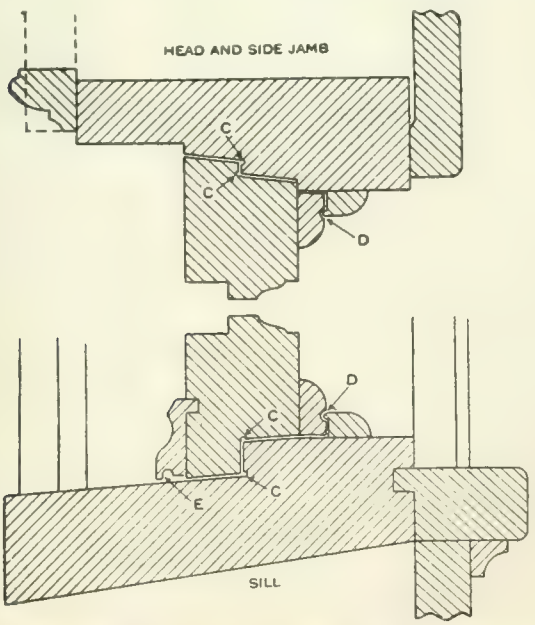
"The manufacture of casement frames and sash has been a problem to many, in regard to making them water-tight. The sketches show an inexpensive method that not only makes them water-tight, but also air-tight. Fig. 1 shows a swing-out, while Fig. 2 shows a swing-in sash.

"The small coves, as indicated at C, serve as water stops, and drain the water down on the jamb, also prevent it from going any farther on the jamb or sash. D serves as a reinforced stop against water or wind. The cove at E prevents the water from going any farther at the bottom of sash. This design can be used for either frame or brick houses, as indicated by the staff mold or casing."

Moving Lumber with Motor Truck

A user of a motor truck for moving lumber tells how he obtains greatest efficiency by their use. He says:

"Old lumber wagons equipped with rollers serve as platforms on which the load is placed in the yard. The truck is backed up to the load and the load rolled on. Arriving at his destination, the driver dumps the load in the same manner as the ordinary roller bolster



Making water tight frames and sash—Fig. 1—section of casement frame sash to swing out.

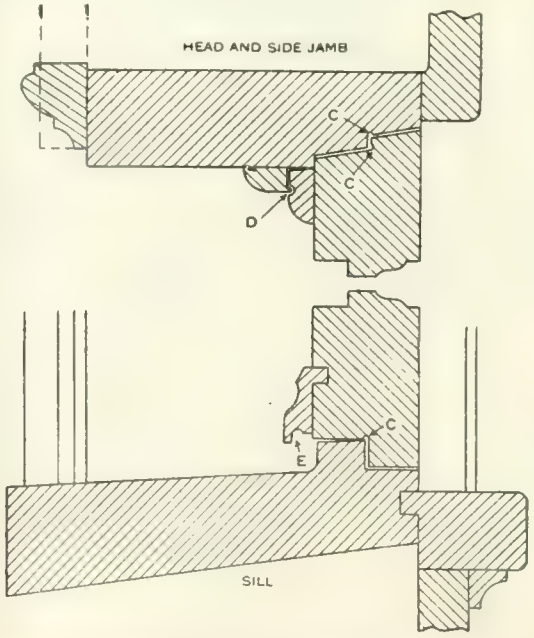


Fig. Vertical cross section of casement frame sash designed to swing in

trailer wagon. Loading and unloading are accomplished in five minutes. While the trucks are on the road, the platforms are being loaded in the yard, so no time will be lost.

"It is possible with this system to load, unload and complete a round-trip of two miles in less than a half hour. A short time ago, we unloaded a car load of 16,500 feet of lumber, or 49,500 pounds, and delivered it to the yards, three-quarters of a mile away, in six hours with one truck. All loading was done by hand.

"Frequently, lumber is hauled a distance of 21 miles. The truck makes three of these round trips, or 126 miles, in 15 hours, including loading and unloading time and a half hour for the driver at noon. On each trip 3,500 feet of lumber is handled, each load weighing about five and one-half tons. Two miles of the stretch is steep, up-hill work."

Three trucks are now in the service of this user. He finds that each truck does the work of four teams.

Insulation of Canadian Houses

While at Drummond, in province of Quebec, Can., recently, and being interested in building construction, I utilized some of my spare time in going around and seeing how buildings were put up in this part of the country. I am inclosing herewith sketches showing in Fig. 1 the way in which the walls were constructed, and

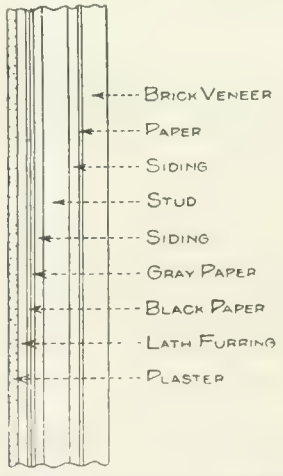


Fig. 1—Vertical section through an enclosing wall of a Canadian House.

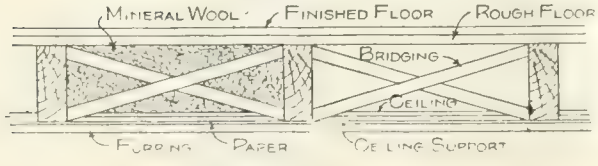


Fig. 2—Cross section of the first floor.

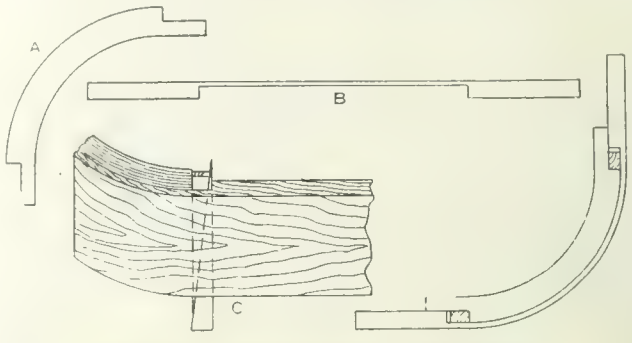
also indicating in Fig. 2 a cross section of the first floor. This is the practice followed in this province where, it must be recalled, some of the winter days experience temperatures ranging from 24 deg. to 30 deg. below zero. In am sending these sketches thinking they may possibly be of interest to some of the readers of the paper.—W. M. L., in Building Age.

To-morrow will have problems of its own. Solve to-day's problems to-day.

Making Curved Stair Risers

The best way I know of to make curved risers is to build up a core and veneer the face of it; this gives the appearance of a solid board bent round the shape of the riser. The method is simple and the expense is hardly worth mentioning.

To make a curved riser where the radius is 10-in., take a board and draw the curve with a 9⅞ in. radius, then keep the same centre and draw a curve 8 in. Cut this board out and use it as pattern to cut the core by.



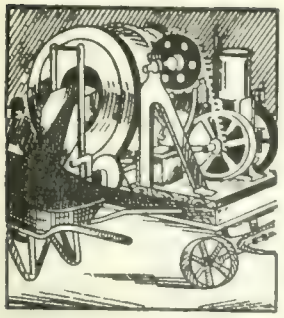
"Build up a core and veneer the face of it."

Use scrap wood for the core and cut out the pieces about ½ in. wider than the outside of pattern, to allow of resawing it. Cut the ends of core as shown in sketch at A, with an offset on it. After having all the pieces cut out, take them to the glue room and build up the core, keeping all the backs of core even and the outside as they will come. To glue up the core, take the first row of pieces and put glue on one side, then put glue on the two sides of the second row, and do this until you have the required height. It is not necessary to use clamps on the core, or to do an extra-good job on it, as it is all covered with veneer.

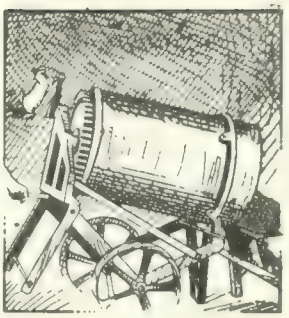
After having the core cut as shown, take a 1-in. board, to use for the riser, and cut it as shown at B. This piece is cut ⅛ in. thick and the ends are their regular thickness. To get the length of this curve, take a cord and stretch it round from one end where the offset is, to the other end at offset. Cut the veneer about 2 in. longer than the cord and make two wedges to fit in at the two ends, as shown at C. To put on the veneer, get the core and veneer warm, put glue on both, then bend the veneer round the core, put a hand-screw at both ends and drive two wedges at each end. This will stretch the veneer round the riser and it will show up very nicely.

To make a circle curve in instead of out, a core is not necessary, but if you want a strong riser put a core in the back and it will help to strengthen it. When making the riser, cut a lot of kerfs 1 in. apart on the back of the board. Bend it to the required curve and put wedge-shaped strips in the kerfs, with glue on them; when dry it will stay at the same curve as the board was bent.—Wood-Worker.

Two hundred and thirty-one building permits were issued in Winnipeg during May by the city building department, covering buildings of an aggregate value of $460,950. For the corresponding period of last year, 217 permits were taken out for buildings of an estimated value of $395,700. For the five months of this year 847 permits have been issued, and the value of the structures covered thereby is placed at $847,650.



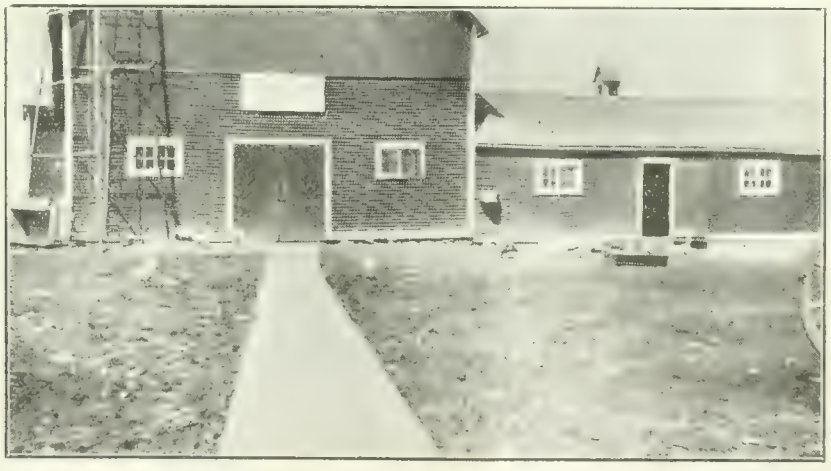
Concrete Department



Concrete on the Farm

The laying of walks around farm buildings is a convenience. Concrete floors and walls in a granary will keep out rats. Concrete floors in the stables will prevent the loss of the liquid manure and assist the farmer in the conservation of its fertility. Concrete is useful in curbing and covering the well to keep out dirt and disease. It can also be used for the floors of garages, which are rapidly increasing on farms.

Other uses for concrete are numerous, but there is one purpose for which it is seldom used, i.e., laying a walk from the house to the barn. The accompanying illustration shows a concrete walk. If such a walk were provided from the barn to the house the farmer could come to the house without getting his feet muddy, which would be highly appreciated by the housewife. The man upon whose farm this picture was taken stated that he had laid this walk two years ago, but that, if he had known what a convenience it would be he would have constructed it many years ago. He says he would not now be without it for three times what it cost.—F.C.N.



A convenient farmyard walk.

Measuring Gravel in Piles

In purchasing, selling, and excavating gravel, there seems to be a growing tendency among contractors, public officials, and others to have the gravel measured in the pile as soon as convenient after it has been excavated. The immediate measurement enables the parties to know the approximate quantity so that they can arrive at an immediate settlement, and the gravel can be hauled away without the trouble of keeping account of the number of loads.

The greater number of these piles are taken from wet pits and located on comparatively level ground. The usual method of excavating is by means of an endless chain or dredge, and the manner of excavating has much to do with the shape of the pile. The more regular the pile, the more easy it is to measure it accurately.

Probably no two engineers use exactly the same method in measuring gravel piles, nor are any two piles exactly the same shape. Before attempting to measure a pile, I view it carefully and determine what mathematical figure it most nearly approaches, or can be made to approach by cutting the same into sections. Where the sides of the pile have a very steep incline, so that the taking of horizontal and vertical measurements would be difficult, I usually take the angle of inclination of the sides at the base, and the distance up the incline, from which the horizontal and vertical distances can be computed trigonometrically.

Some piles will most nearly approach a cone, usually with an elliptical base, the area of which can be obtained by getting the major and minor axes. The quantity can be calculated by cutting the pile into quarters, taking the angle of inclination and the slant height from all four sides, and then computing trigonometrically the horizontal and vertical distances. The sums of the horizontal distance obtained from opposite sides will give each axis. The average of all four vertical heights will give the average height of the cone, at the same time taking into consideration the difference that may be in the level of the ground at all four points of the base.

If the pile should take the shape of a frustum of a cone, set a stake in the middle of the top, so that the highest point will be the vertex; and calculate as before, taking the extended volume from the result.

If the pile has curved sides from top to bottom, it will be necessary to cut it into sections (parallel to the average level of the base), and calculate each section thus obtained either as a separate frustum of a cone or a prismoid, using the prismoidal formula.

General Form of Pile

The most general form of pile is oblong, with steep sides curved from top to bottom, coming so nearly to an apex as to be easily extended, and having elliptical ends. My usual method in measuring such a pile is to first cut off each end by a vertical plane at right angles to the main axis of the pile; then divide the remaining middle portion into three (or some multiple of three) sections (depending on the regularity of the pile), by vertical planes at right angles to the main axis of the pile, so that, when the area of each cross-section is obtained, the entire middle portion can be calculated as one or more prismoids.

To get the area of each cross-section, take the angle of inclination and the distance up the incline for each course in going up the pile from the base to the top (the end of each course being so taken as to correspond to the greatest break in the slope of the side of the pile); and from the data thus obtained, the horizontal and vertical distances can be computed trigonometrically, and the sections divided into triangles and trapezoids, and the area obtained.

The end sections can be calculated as half the frustum of a cone with an elliptical base, one axis of which will be the bottom width of the end cross-section, and the half of the other axis will be the horizontal distance from the end cross-section to the extreme end of the pile at the base, running in the same direction as the main axis. The method of obtaining the cubical contents of these end half-cones will be the same as in the first case described.

If the pile be low and spread out over considerable ground so that the horizontal distances can be easily measured, it may be cut vertically into squares, say 10 feet each way if irregular, or 20 feet if regular. The elevation of each corner of the squares, as well as the elevation of the ground at the base, should be taken by a leveling instrument. The average elevation of the ground at the base should be obtained by taking elevations at equal distances around the base in such a manner as to average the high and low points as nearly as possible. The average level of the base thus obtained, taken from the average level of all four corners of each square, will give the vertical height of the prismoid whose end is that particular square. From these data the cubical contents of each prismoid, and the cubical contents of the entire pile, can be computed. —Oliver Clark, in Engineering News.

Accelerator for Hardening Concrete

Experiments have been made by the United States Bureau of Standards to develop a method for accelerating the hardening of concrete in order that the material might be utilized in place of the willow mats that have been used in the past along the Mississippi River. The Bureau finds that 4 per cent. of calcium chloride added to the mixing water increases the strength of the concrete at the age of one day 100 per cent. or more. In some cases the strength of the concrete in which the calcium chloride was used at the age of two days equaled 15 per cent. or more of the strength normally attained in one month.

Questions and Answers

The following question has been received by The Canadian Builder. The editor will be glad to receive an answer from our readers as well as answers to the questions in past issues. Those whose answers are accepted for publication will have their subscriptions extended for one year.

How Soon Can Roof Water be Used?

(6) Question—When is it safe to use water from a newly shingled roof for drinking or cooking purposes? Is there any wash or preparation which would make the roof water safer for house use?—C, Ontario.

Answer to question 6, May, 1917—If "C, Ontario" means a roof newly covered with shingles as they come from the mill, the rain water from such a roof should be quite safe for culinary use directly the roof is completed, provided the shingles have been handled in a cleanly manner throughout the job. The water might have a woody taste until the roof had been well washed by a few showers, but would not be injurious to health. If the shingles have been dipped or brush coated with stain it depends on the ingredients of the stain how soon the water may be used, in this case the maker of the stain is the only person who could say whether the rain water would be safe to use while there was any stain remaining on the roof. A good arrangement would be to have a separate cistern for drinking water, the water to pass through a filter before entering the cistern. If a cut-off was provided in the conductor pipe the first rush of water from the roof could be run into the cistern for general use, then, the roof being washed clean, the water could be diverted to the drinking-water cistern. The filter need not be a complicated arrangement, a chamber partly filled with clean, sharp sand, and large enough to be easily emptied and cleaned would answer the purpose.

If the roof is not likely to become fouled with dust from the road-side, or from other causes, the use of the cut-off without filter would likely prove satisfactory.

A weak solution of chloride of lime added to water containing disease germs will render the water almost sterile in ten minutes, according to tests made by the discoverers of this method, Dr. G. G. Nasmith and Dr. Graham of the Provincial Board of Health, who advise the use of their method to obtain pure water. Of course the lime treatment will not remove actual dirt from the water.—S. T. S.

Amount of Concrete Required

(7) Question—What amount of cement shall I require for a foundation 14 x 14 ft. with 7 ft. wall, and what mixture is considered best practise for foundations?—Carpenter.

Answer to question 7—Regarding the amount of materials required for a cellar 14 x 14 ft., 7 ft. high, we would advise that these walls be built 12 ins. thick, resting centrally on a footing 22 ins. wide and 6 ins. deep. Concrete for this work should be mixed in the proportions of one bag of cement to 2½ cu. ft. of sand and 5 cu. ft. of crushed stone or pebbles. If bank-run gravel is used same should be screened through a ¼ inch screen, the material passing through the screen being considered as sand and the materials retained on the screen, up to 2 inches, being considered as gravel.

The amount of materials required for walls and footing will be 22 barrels of cement, 8 cu. yds. of sand and 16 cu. yds. of crushed stone or pebbles.—R.

News From Coast to Coast

Sarnia
Exchange to Promote House Construct on

A meeting of the Sarnia Builders' Exchange was held on June 1. A report was received from the committee appointed at the recent meeting to visit Port Huron and interview the members of the Builders' Exchange there. James Shanks, representing the exchange, and T. H. Cook, secretary of the Board of Trade, made a thorough investigation of the methods adopted by the Builders' Exchange across the river, and secured some valuable information regarding the construction of houses and the financing of the same. The subject was discussed thoroughly by those present, and it is the intention of the members to make a canvass of the city and endeavor to secure $100,000 stock in a company to be used for the erection of homes suitable for the workingmen. The company would finance the construction of a home where the party was reliable, the sum to be paid back in rent monthly. It is thought that this will be an incentive to workingmen to own a home of their own.

The charter of the Builders' Exchange has arrived, and another meeting will be held in about two weeks, when the officers will be elected. The Board of Trade is anxious that the Builders' Exchange utilize the room recently secured by the board in the Bank of Montreal building.

Montreal Exchange in New Offices

The Montreal Builders' Exchange is now located in the Drummond Building, corner St. Catharine and Peel Sts., Montreal, where they have fine quarters. The secretary, David K. Trotter, will be glad to meet those in the building trade at this address.

To celebrate the opening of these new offices the Exchange held a smoker, presided over by Mr. W. Ramsey of the Pedlar People Limited. Mr. James Simpson, who was among those who received the original charter, gave a history of the Montreal Exchanges. Others taking part in the programme were J. P. Anglin, President of the Exchange; N. Beullac, J. E. Walsh; W. C. Munn, Vice-President; Alex. W. Bremner; and John Quinlan, Past President.

Montreal's New Building By-Law

The promised new code of building by-laws for Montreal was the subject of representations to the Board of Control by members of the Builders' Exchange, Canadian Society of Civil Engineers, and Province of Quebec Association of Architects, on May 4. The deputation was introduced by Mr. Hugh Vallance, President of the Architects' Association. The speakers were Mr. Walter J. Francis, of the C.S.C.E.; Mr. J. P. Anglin, President of the Builders' Exchange; Mr. Joseph Venne, Past President of the Architects' Association, and Mr. M. Beullac, of the Builders' Exchange, who represented the steel interests.

The new code was ordered seven years ago and was drafted by Mr. Francis and Mr. Venne, who reported in 1913. Since then the matter has been in the hands of the city. The code has been referred to the law and other departments, but has not been adopted by the Council. The deputation were anxious that the code, which is a great improvement on the one now existing, should be put into operation immediately. This was in the interests of fire protection and the general well-being of the building trade.

New plumbing and heating laws are being prepared and the city attorney, Mr. Laurendeau, advanced this as the reason of the delay. The delegation thought this should be made into a separate code to permit the new building by-laws being put into immediate operation. It is expected that the matter will be disposed of definitely by the council when the matter is again brought up for discussion.

Stratford Exchange Holds Banquet

The annual banquet of the Stratford Builders' Exchange was held at the Madison House, Stratford, on May 8. Mr. Clare Myers, President of the Exchange, was toast master and a pleasant and profitable evening was spent.

An informal program in which everyone present took part, was much enjoyed. The city of Stratford was represented by Mayor Monteith and also by Inspector Geo. Heideman and Assistant Inspector Dixon of the building department. Thoughts of the war, as usual, were present to the minds of all, and a toast was proposed to "Our Overseas Members," particular reference being made to Lieut.-Col. John L. Youngs and Lieut. John Keyes, two prominent builders who are serving their country in France. It was stated that Col. Youngs recently resigned his rank to get back to the line of battle, where a few weeks ago his son, Lieutenant J. L. Youngs, gave up his life. Col. Youngs has been mentioned in despatches.

Builders Busy in Halifax

There is somewhat of a boom in residential building construction in the city this month, and during April also there was considerable new work of this nature undertaken. April of this year did not come up to the same month of 1916 in the total value of work for which permits were issued, the totals being $70,935 and $95,924 respectively. But the total for the first four months of 1917 is ahead of the same four months of last year $188,000 to $141,716. Since May 1st, there have been no big building undertakings announced. Work on the new hospital on Camp Hill is being pushed along, the mechanics working extra hours. Work is also being pushed on Dr. Little's new building at the

corner of Gottingen and Cunard Sts., and it is reported a Sydney firm is negotiating for the whole lower floor for a 10-15 cent store. The Woolworth company is to have a Gottingen St. branch and have taken a ten year lease of R. H. Elliott's property on the corner of Market Lane, nearly opposite Cunard St., at $1,000 per year. The front is now fenced in while repairs and alterations, which it is understood will cost some thousands of dollars are being made.

William Rutherford Honored

Mr. William Rutherford, Secretary-Treasurer of William Rutherford & Sons, general lumber merchants, 425 Atwater Ave., Montreal, was elected Chairman of the Montreal Branch of the Canadian Manufacturers' Association on May 15, 1917.

Mr. Rutherford began his business career with the Phoenix Insurance Co., Montreal. Later he was with

WM. RUTHERFORD
who has been elected chairman of the Montreal Branch C. M. A.
(British and Colonial Press Photo)

the Pillow-Hersey Mfg. Co. In 1898 he became identified with his father in the lumber business, and when the present company was incorporated, became secretary-treasurer.

He was chairman of the Legislative Committee and Membership Committee of the Montreal Branch, Canadian Manufacturers' Association, 1915-1916. He has been interested in the municipal work of the city of Westmount where he resides and served as mayor of Westmount, Que., 1911-1912; was chairman of Westmount School Commissioners; vice-president Montreal Technical School, and is president, Montreal Mechanics Institute.

Building Permits for April

As compared with the corresponding month of last year, building permits in April showed a decrease of $689,883, or 17.6 per cent., the value for April, 1916, being $3,899,892. As compared with April of last year, there were gains in Nova Scotia, Quebec, Ontario and Saskatchewan, but declines in New Brunswick, Manitoba, Alberta and British Columbia. Of the larger cities, Montreal, Toronto and Vancouver showed gains of 81 per cent., 19 per cent., and 118 per cent., respectively, and Winnipeg a decline of 5 per cent., as compared with March. Of the smaller centres, Ottawa, Hamilton and Victoria showed substantial increases over both March, 1917, and April, 1916, but in St. John, N.B., a decline was indicated in both cases. Halifax and Quebec recorded increases over March, but were somewhat lower than in April, 1916.

The Union Cement Company, Owen Sound, Ont., will double the capacity of its plant this year, and bring the output up to 2,000 bbl. per day. It will increase its capital from $200,000 to $1,000,000. The company will change to electric power from steam. It is estimated that the total cost will be $60,000. The contract for the enlargement has been let provisionally to the Fuller Engineering Company, of Allentown, Pa., and the work is to be gone on with at an early date.

ESTIMATED COST OF BUILDING WORK AS INDICATED BY BUILDING PERMITS ISSUED IN THIRTY-FIVE CITIES

CITY	March 1917	April 1917	April 1916	March, 1917, compared with March, 1916 Increase or Decrease	Per Cent
Nova Scotia	$ 99,563	$108,850	$106,824	- $ 2,026	— 1.89
Halifax	68,475	70,935	95,924	— 24,989	— 26.05
Sydney	22,088	37,915	10,900	+ 27,015	+ 247.84
New Brunswick	277,200	44,145	73,400	— 29,255	— 39.86
Moncton		19,645	26,600	- 6,955	— 26.15
St. John	277,200	24,500	46,800	- 22,300	— 47.65
Quebec	613,229	878,503	837,313	+ 41,190	+ 4.80
Maisonneuve	128,529	8,400	17,000	- 8,600	— 50.59
Montreal	343,460	622,940	435,805	+ 187,135	+ 42.94
Quebec	129,699	219,798	267,195	- 47,397	— 17.74
Sherbrooke	7,000	18,700	3,000	+ 15,700	+ 523.33
Three Rivers	3,795	6,565	66,925	- 60,360	— 90.19
Westmount	750	2,100	47,388	— 45,288	— 95.57
Ontario	1,177,605	1,782,957	1,443,225	+ 339,732	+ 23.54
Brantford	13,260	13,430	17,325	— 3,895	— 22.48
Ft. William	2,250	114,475	38,450	+ 76,025	+ 197.72
Guelph	14,369	19,995	21,812	— 1,817	— 8.33
Hamilton	215,000	360,000	290,595	+ 69,405	+ 23.88
Kingston	11,040	32,443	30,251	+ 2,192	+ 7.25
Kitchener	18,530	75,897	50,495	+ 25,402	+ 50.31
London	46,300	84,290	82,550	+ 1,740	+ 2.11
Ottawa	63,175	141,150	89,175	+ 51,975	+ 59.4
Peterborough	4,945	18,910	39,815	— 20,905	— 52.51
Port Arthur	220,715	109,913	49,440	+ 60,473	+ 122.32
Stratford	11,258	32,250	31,446	+ 804	+ 2.56
St. Catharines	34,740	8,307	78,775	— 70,468	— 89.45
St. Thomas	1,170	8,505	8,200	+ 305	+ 3.72
Toronto	414,708	594,652	457,646	+ 137,006	+ 29.94
Windsor	106,115	168,740	157,250	+ 11,490	+ 7.31
Manitoba	159,610	160,065	697,000	— 536,935	— 77.18
Brandon	2,060	11,715	24,800	— 13,085	— 52.76
Winnipeg	157,550	148,350	672,200	— 523,850	— 77.93
Saskatchewan	23,300	96,845	35,025	+ 61,820	+ 176.50
Moose Jaw	5,200	53,270	19,825	+ 33,445	+ 168.70
Regina	6,885	36,000	9,500	+ 26,500	+ 278.95
Saskatoon	11,215	7,575	5,700	+ 1,875	+ 32.89
Alberta	18,900	42,050	49,210	— 7,160	— 14.55
Calgary	14,300	33,700	32,500	+ 1,200	+ 3.69
Edmonton	4,600	8,350	16,710	— 8,360	+ 50.03
British Columbia	50,180	96,594	657,895	— 561,301	— 85.32
N. Westminster	14,185	4,565	5,155	— 1,590	— 30.84
Vancouver	33,715	73,824	641,605	— 567,781	— 88.49
Victoria	2,280	19,205	11,135	- 8,070	- 72.47
Total (35 cities)	2,410,587	3,210,009	3,899,892	— 689,883	— 17.69

BUILDING PERMITS ISSUED IN CERTAIN OTHER CITIES AND TOWNS

Cities and towns	March 1917	April 1917	April 1916
Brockville	18,050	8,155	
Chatham	2,810	7,354	22,220
Cobourg		800	300
Belleville	1,000	800	6,400
Galt	7,935	24,375	13,210
Kenilworth		8,200	
Lachine		21,963	12,395
Lethbridge			3,315
Medicine Hat	7,340	37,300	3,150
Nanaimo		435	1,240
Niagara Falls	7,000	12,000	2,662
North Bay	1		3,000
North Vancouver	3		725
Oak Bay			
Oshawa	14,8	14,725	12,115
Outremont	4,0	47,000	35,600
Owen Sound	2,5	2,0	2,0
Paris		3,950	525
Penticton	3,200	1,800	200
Point Grey	2,405	11,315	3,025
Prince Rupert			2,150
South Vancouver	10,865	4,700	3,375
Sudbury	6,000	1,800	75,650
Welland	31,115	53,469	20,086
Woodstock	7,327	18,609	15,206
Vernon		1,400	
Yorkton	750	9,390	5,310

Economize by Filling the Cars

A little more co-operation between the merchants and the railways will do much to relieve the present freight situation. The railways are not trying to shift the responsibility on to the public, but are asking the public's help. Much more tonnage, for instance, could be handled with the existing locomotive power and terminal facilities if cars were loaded to capacity instead of being so often only two-thirds full. In the old days when traffic was lighter, it mattered less to the railways if a shipper did not use all the space he paid for—that was the shipper's loss. But now it is realized that the extravagance of one shipper may cause delay to others owing to the limited amount of locomotive power and terminal facilities. The shortage is not so much in equipment as in train crews, and labor in the yards and roundhouses. Anything which can help to secure quicker clearance and freer movement in the yards, helps to speed up the movement of freight. Another drawback to the economical movement of freight is that a great many consignees order not the full carload of freight, but merely the minimum allowed under the classification. It would materially help to solve the problem if in placing orders consignees would order enough to fill a car to capacity instead of the minimum, which often does not represent more than half a carload.

The question of the capacity of cars is itself the subject of investigation. The standard of loading grain, for instance, has remained the same for many years, but improvement in the engineering of cars has gone on steadily, so that the modern freight car can bear stresses greatly in excess of what was possible twenty years ago. The result is that there is prospect of considerably increasing the load line on quite a large proportion of freight equipment, thus increasing the train capacity without requiring additional train crews. Grain cars rated for 80,000 lbs., are found capable of carrying over 90,000.

It has been figured that if the average load could be increased on Canadian railways in 1917 by five times over that of 1915, this would be equivalent to 54,800 additional cars, requiring no additional locomotives or man-power.

Canadian business men are, therefore, being urged to co-operate with the railways in their endeavor to increase the existing carrying capacity, by using to better advantage the present available rolling stock. Light, bulky commodities, of which there are many, should be loaded to the full cubic capacity of cars. Heavier freight should be loaded to the full carrying capacity which is 10 per cent. in excess of their stenciled capacity.

The following figures are taken from the Railway Statistics of the Dominion of Canada, issued by the Deputy Minister of the Department of Railways and Canals, and cover all the railways of Canada:

Note.—1907 is the first and 1915 the last year for which figures are available.

Total tons freight carried 1 mile, 1907, 11,687,711,830; 1915, 17,661,309,723; increase, 51.1%.

Aggregate capacity of freight cars (in tons), 1917, 2,908, 903; 1915, 6,731,265; increase, 131.4%.

Total freight cars, 1907, 105,540; 1915, 201,690; increase, 91.1%.

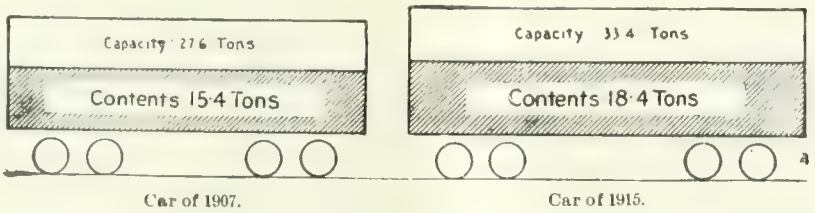
The car capacity increased 5.8 tons. The contents increased 3.0 tons.

48% of the additional capacity provided was not used.

The public is asked to co-operate with the railways in an endeavor to remedy the existing car shortage.

It can be done by utilizing to better advantage the present available rolling stock.

By increasing the average car load to 23.4 tons or 5 tons more than during 1915 would be equivalent to the placing of 54,800 additional cars in service.



Car of 1907. Car of 1915.

Incorporation of Sarnia Builders' Exchange

The Sarnia Builders' Exchange has been incorporated. The incorporators are George A. C. Andrew and James Harrison Shanks, builders; Norris Elgin Gibb and John Elnor, carpenters; Joseph Gravelle, painter; John McGibbon, lumber merchant; and Harry Bailey Fenton, manufacturer, all of the city of Sarnia.

The objects of the Exchange are: (a) To promote and protect the interests of those engaged in the various trades and occupations connected with the construction and erection of buildings in the said County of Lambton, and especially in the said City of Sarnia; (b) To establish and maintain uniformity in commercial usages relating to building and building trades; (c) To secure and furnish to its members information on matters pertaining to their business interests; (d) To prevent, as far as possible, and to adjust difficulties and misunderstandings in relation to said occupations; (e) To inculcate just and equitable principles, and (f) To promote good feeling and harmony amongst those engaged in the various building trades and other kindred trades.

During May, 45 building permits in Woodstock, Ont., were issued, the total value of the buildings being $24,636.

The value of Peterborough building permits issued during the month of May, 1917, is nearly four times as much as were issued in May of last year.

The figures are:	Number of Permits	Value
May, 1917	33	$21,018.00
May, 1916	19	5,750.00
Increase		15,268.00

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Price List of Building Materials—Revised to Date

EDITOR'S NOTE—Great care is exercised in obtaining prices for this department. They are as accurate as it is possible for us to make them. We know, however, that because of varying conditions, different dealers' prices are bound to vary somewhat; and our purpose in publishing this department is to give readers an idea of prices, rather than absolutely definite information.

PRICE AT MONTREAL

Hemlock Lumber

2 x 4 in. to 2 x 12 in., 8 to 14 ft.	$28.00
2 x 4 in. to 2 x 12 in., 16 ft.	30.00
2 x 4 in. to 2 x 12 in., 18 ft.	30.00 to 32.00
1 in. hemlock No. 1	28.00
No. 1 hemlock decking	26.00 to 30.00
No. 2 hemlock dimensions and 1 in.	26.00 to 30.00

Pine

1 in. common and better pine 8 to 12 in. wide, rough	$32.00 to 40.00
2 in. white pine, mill stock	32.00 to 40.00
7/8 x 8 and 10 in. pine shelving	42.00 to 45.00
7/8 x 12 pine shelving	50.00
No. 1 white pine flooring	40.00
No. 1 spruce flooring	34.00
No. 1 pine decking, D2S	40.00
No. 1 pine V or beaded sheeting	42.00
No. 2 pine V or beaded sheeting	37.00

Pine Trim for Paint Finish

4 in. casing, per 100 ft.	$1.75
5 in. casing, per 100 ft.	2.10
8 in. pine base, per 100 ft.	3.25
10 in. pine base, per 100 ft.	4.20
4 in. pine window stool, per 100 ft.	2.75

Shingles, Lath, Roofing, Etc.

No. 1 pine lath	5.00
No. 2 pine lath	4.50
No. 1 spruce lath	4.00

Cedar Posts—Fence

5 in. at small end	5c. foot
7 in. at small end	7c. foot

Hardware

Nails, wire, common	$5.25 base
Nails, cut, common	5.00 "
Sash weights, cast iron	2.50 per 100 lbs.
Tarred felt paper	75. to 1.25 roll
Building paper	1.20 roll

Brick, Tile, Terra Cotta, Sewer Pipe

No. 1 dry pressed red bricks	18.00
No. 1 dry pressed buff bricks	21.00
Red stock bricks	14.00
Grey stock bricks	13.00
Wire cut brick for foundation work	12.50
Fire brick	60.00
Sewer pipe, 4 inch	12½c. foot
Sewer pipe, 6 inch	20c. foot

Cement, Plaster, Stone, Etc.

Cement (bags extra)	2.60 bbl.
Sand, for cement or brick work	1.10 ton
Lime	10.00 per ton
Hydrated lime	17.00
Mortar color	6.50 bbl.
Plaster of paris	2.80 "
Crushed stone, 2 in.	1.40
Crushed stone, 1 in.	1.65
Crushed stone, 3/8 in.	1.75
Hardwall plaster	14.00
Gravel	1.20 per ton
Hair (plaster)	.03 per lb.

PRICE AT TORONTO

Hemlock Lumber (Sized)

2 x 4 in., to 2 x 12 in., 12 to 14 ft.	$33.00 to 34.00
2 x 4 in., to 2 x 12 in., 16 ft. and 10 ft.	34.00 to 35.00
2 x 4 in. to 2 x 12 in., 18 ft.	36.00 to 37.00
1 in. hemlock, No. 1, 6 in. wide	34.00
1 x 8 in. and 1 x 10 in., 10 ft. to 16 ft.	35.00
No. 1 hemlock decking	32.00 to 35.00
No. 2 hemlock dimensions and 1 in.	28.00 to 32.00

Pine

1 in. common and better pine 8 to 12 in. wide, rough	$35.00 to 42.00
2 in. white pine, mill run	38.00 to 48.00
7/8 x 8 and 10 in., pine shelving	47.00 to 52.00
7/8 x 12 pine shelving	60.00
No. 1 white pine flooring	42.00 to 45.00
No. 1 spruce flooring	37.00 to 38.00
No. 1 pine decking, D2S	40.00 to 42.00
Spruce decking	37.00 to 42.00
No. 1 pine V or beaded sheeting	48.00 to 50.00
No. 2 pine V or beaded sheeting	43.00 to 45.00

No. 1 Common Long Leaf Yellow Pine

2 x 4 in. to 2 x 12 in., 10 to 16 ft.	$45.00 to 50.00
2 x 4 in. to 2 x 12 in., 18 to 20 ft.	46.00 to 52.00
2 x 4 in. to 2 x 12 in., 22 to 24 ft.	50.00 to 55.00

Yellow Pine Finish

4/4 x 6, 8, 10 and 12 B. & B. smoke dried	$51.00 to 55.00
5/4 x " " " "	55.00 to 61.00
6/4 x " " " "	55.00 to 61.00
8/4 x " " " "	55.00 to 61.00
4/4 x " " " steam dried	48.00 to 52.00
5/4 x " " " "	50.00 to 55.00
6/4 x " " " "	50.00 to 55.00
8/4 x " " " "	60.00 to 65.00

Pine Trim for Paint Finish

4 in. casing, per 100 ft.	$1.75 to 2.25
5 in. casing, per 100 ft.	2.00 to 2.75
8 in. pine base, per 100 ft.	2 75 to 4.25
10 in. pine base, per 100 ft.	3.80 to 5.25
4 in. pine window stool, per 100 ft.	3.50

Hardwood Trim, Flooring, Etc.

Quotations will be given on request. See editor's note above.

Shingles, Lath, Roofing Etc.

XXX B. C. cedar shingles	$5.50 per M
N. B. extras	5.50
No. 1 pine lath	7.00 per M
No. 2 pine lath	6.50
No. 1 spruce lath	6.00
Roofing	1 ply-$1.25-1.70 2 ply- 1.50-2.50 per 3 ply- 1.75-3.00 sq.

Cedar Posts—Fence

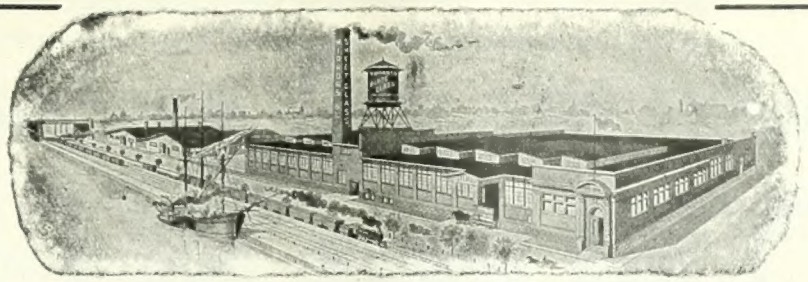
5 in. at small end	.30 each
7 in. at small end	.60 each

Hardware

Nails, wire, common	$5.20 cwt.
Nails, cut, common	5.05
Sash weights, cast iron	2 25
Tarred paper	75 to 1.25 roll
Building paper, plain	1 20

NOTE TO READERS. We would be glad to have suggestions from readers as to the extension or modification of this list.

RED
S
BRAND
WINDOW
GLASS



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Head Office:
MILTON, ONT.

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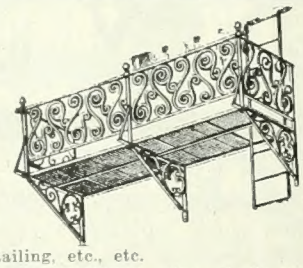
IRON WORK



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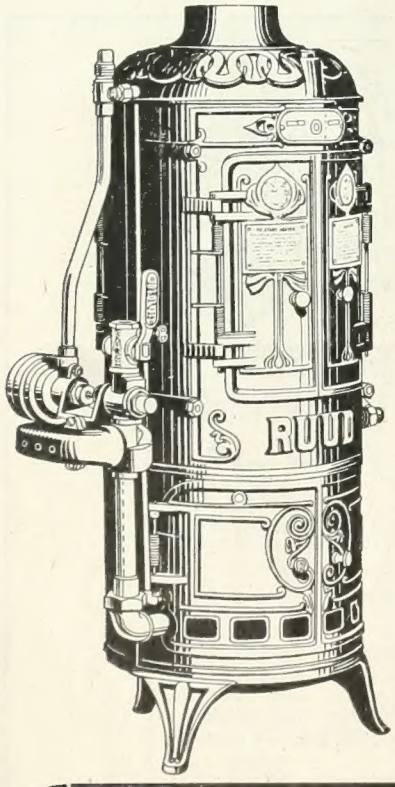
Index to Advertisers



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Phone Adel. 2180

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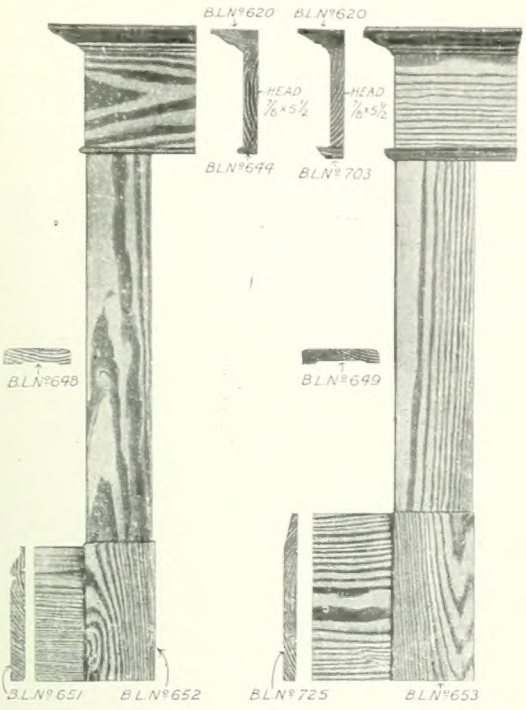

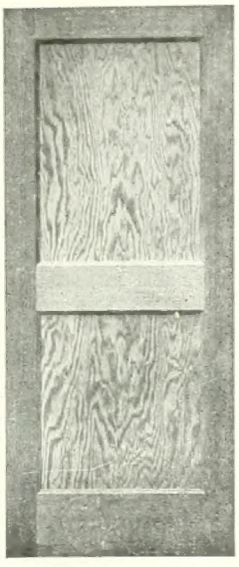

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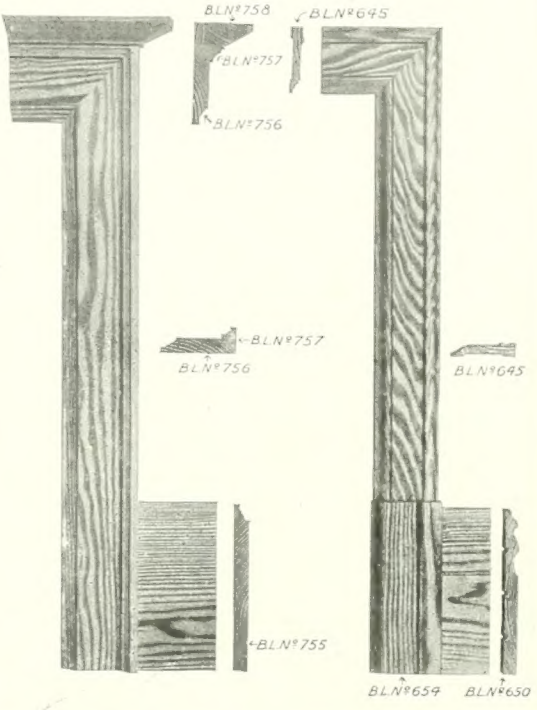

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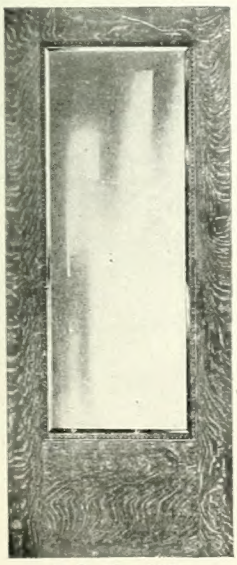

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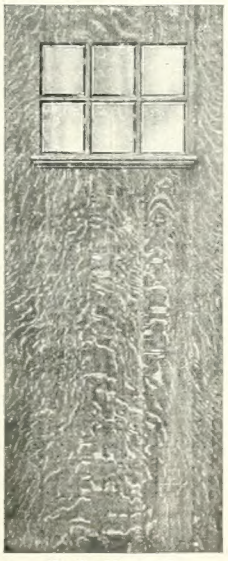

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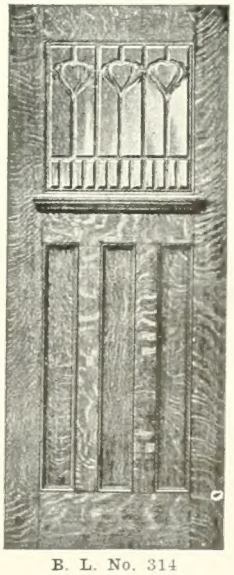

B. L. No. 314

THE

Elliot Woodworker

SAVES LABOR

There are over one thousand satisfied users.

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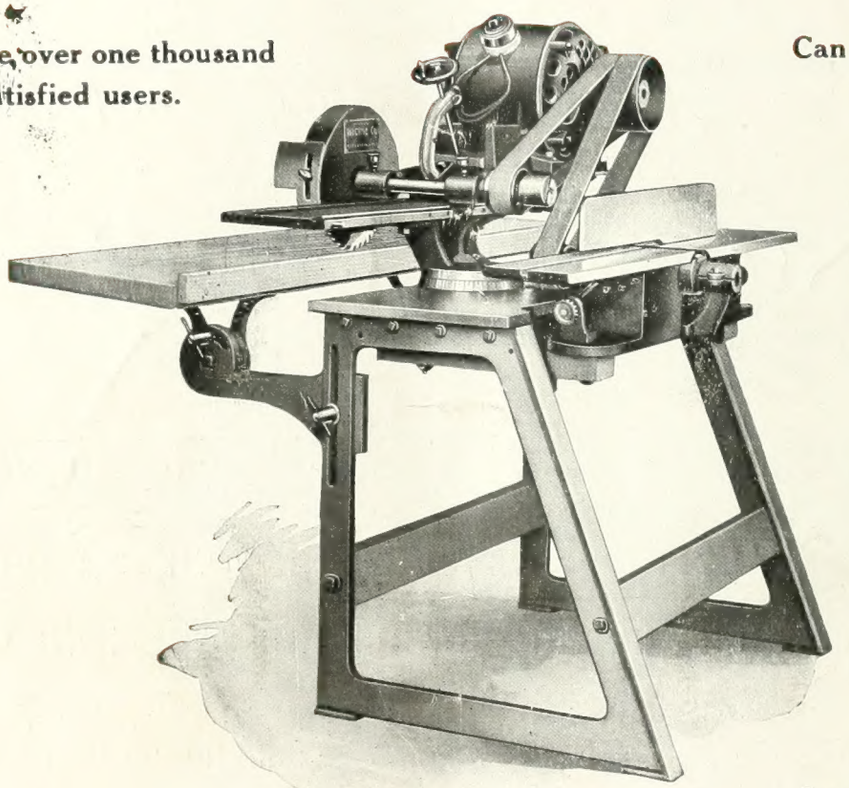

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By removing jointer-belt, the slide is swung around and can be set instantly to mitre any degree, or dado door and window-frames, cupboards, house your stair-strings, run mouldings, bore, groove, plow, cut, foot and plumb, and side cuts of jack rafters.

This machine is being adopted by the Brooklyn Navy Yards, the Norfolk Yards (where we have delivered three machines in the last month), the West Point Military Academy, and other United States Government works.

It will stand up to the heaviest duty required. It is a great money-saver to the user. Now is the time to save 25 to 30 per cent. on your carpenter work.

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